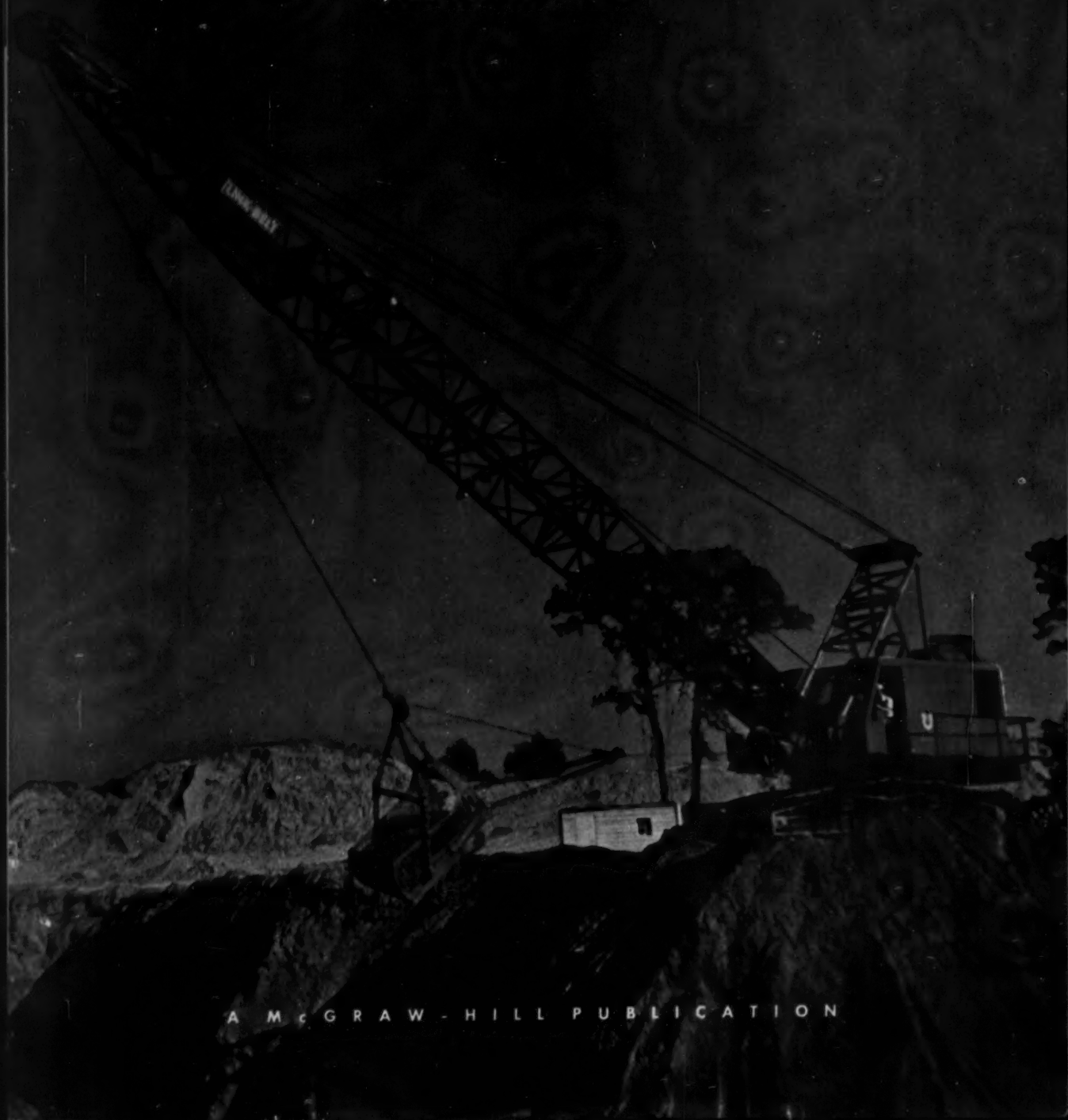


50 CENTS

CONSTRUCTION

METHODS AND EQUIPMENT

November 1955



A MCGRAW-HILL PUBLICATION



Uranium Strike!

Back in the hills of the Colorado Plateau, the dependability and low-cost operation of Le Roi Compressors pay off


Uranium is a magic name. And to anyone interested in low-cost, dependable, air compressor operation, the name of Le Roi is magic, too. Just take a look at a few features that keep Le Roi Compressors running after others have "called it quits":

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- Larger engines for greater reserve power permit slower operating speeds, longer life.

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C-187

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B.F. Goodrich



All-Nylon tires recapped again and again, cut costs one-half, contractor reports

S. J. GROVES AND SONS CO., builds roads all over North and South America. Equipment used by this Minneapolis, Minn., contractor includes tractor graders and scrapers, oil and sprinkler trucks, low-boys and trailers, dump trucks and compactors.

To keep tire costs at a minimum, this company uses B. F. Goodrich *all-nylon* tires. On the Indiana Turnpike, the project engineer reports: an aver-

age life of over 4,000 hours, sometimes as many as 5 recaps. No wonder Groves finds B. F. Goodrich tires cut costs one-half!

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B. F. Goodrich makes a complete line of *all-nylon* tires for every off-the-road job. See your B. F. Goodrich retailer today and find out how you can cut tire costs to a minimum. His address is listed under Tires in the Yellow Pages of your phone book. Or write The B. F. Goodrich Co., Tire & Equipment Division, Akron 18, Ohio.

Specify B. F. Goodrich tires when ordering new equipment



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S. J. GROVES uses 7 kinds of B. F. Goodrich tires on the Indiana Turnpike project, including the Super Traction tires shown above.





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CONSTRUCTION

Volume 37

Number 11

METHODS

Established

1919

AND EQUIPMENT

November 1955

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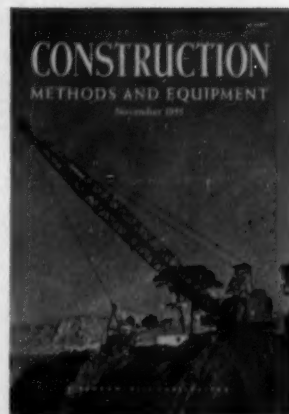
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On the Cover

Link-Belt dragline with a 70-ft boom and a 2 1/2-yd bucket is working on Route 75, 10 mi east of Dallas. It strips gravel and stockpiles it to be hauled away for washing and grading. The dragline is a Speeder K-595 owned by Gifford-Hill & Co., Inc., of Dallas. If the sky looks extra blue, remember it's a Texas sky.

• REPRINTS of the CM&E series of articles on Concrete Mixing and Placing now are available in booklet form. The price is 50c each for up to nine copies; 40c each for quantities of 10 or more. Address your orders to: Editor, Construction Methods and Equipment, 330 W. 42nd St., New York 36, N. Y.



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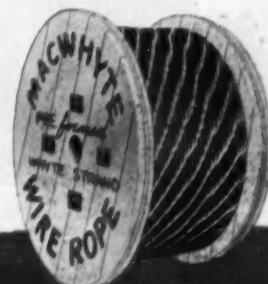
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Pay Dirt in This Issue

November, 1955

Big Job Demands Big Tools 52

Rugged section of Pennsylvania Turnpike's Northeastern Extension cuts through 70 mi of mountains. Contractors attack job with biggest and newest equipment available. Shovels range up to 6 yd, and trucks carry as much as 50 tons.

Bridge Slab Prestressed Around Curve 60

Construction of curved, post-tensioned concrete bridge slab poses problems of layout, falsework, and tensioning.

How to Strengthen Your Liability Coverage 66

A construction insurance expert discusses dangerous gaps in many liability policies. Second of a three-part series.

Caisson Foundations Complicate Tunnel Job 80

Unexpected obstructions must be removed, others underpinned before subway can be tunneled beneath Chicago post office.

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Comparison chart lists important features of compressors currently in production with a rating of at least 100 cfm.

Special Tools Spark Pipeline Job 106

Natural gas line from Pennsylvania to Connecticut traverses varied terrain that calls for machines both large and small.

School Teaches Care, Operation of Earthmovers 126

Contractors discover that graduates of nation's first independently run operators' school make valuable employees.

Paving . . . How to Get the Best Results 151

Methods, equipment and materials for bituminous penetration macadam are discussed in detail in third article of a series.

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NEXT MONTH

Hard granite makes tough drilling on long water tunnel, but joint-venture contractors Coker-Kiewit average better than 2½ rounds per shift. Fast transportation is big factor. Trains are pulled by diesel locomotives with torque converters.

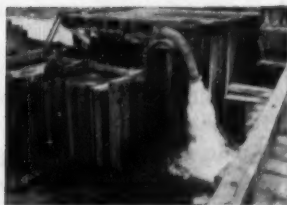
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Building Turnpike Called for Best in Men, Equipment

Traffic on Ohio's 240 mile super-safe, super-highway is averaging about 50,000 vehicles a day. It is easy, easy sailing for the turnpike drivers but it was the hardest kind of drudgery and frequently, discouragement for the turnpike builders.

On the Sandusky River bridge near Fremont for example, continuous pumping was necessary to keep the cofferdams dry for construction of piers. The contractor, George Vang, Inc., of Pittsburgh, placed 10 Gorman-Rupp pumps on the job. Charles Solander, pump operator, states: "I've had them running 3 weeks at a time, 24 hours a day, and no trouble."

The Gorman-Rupp guarantee stated in plain language is backed by a long record of just such proven performance On-the-Job.



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- One man handling — engine driven pump only 130 pounds job-to-job. Motor driven 165 pounds.
- Easy hook-and-tighten fittings with hose connected.

See this pump at work on the job, through your Gorman-Rupp distributor. It is absolutely guaranteed to outperform and outlast any 3 in. single diaphragm pump comparably powered now on the market.

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NOTES FROM THE FIELD - -

Bridging Kokosing River on U. S. Route 36 at Mount Vernon, O. Model 3D-E1½ diaphragm pump and model 3362-B contractors' pump, both electric powered, and model 3205 contractors' pump engine powered - On The Job.

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A NEW AIR-COOLED INDUSTRIAL ENGINE

**Designed specifically
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NEW! Reserve Power—C2-90's full-power rating provides a ready reserve for generators, pumps, pavers, crushers, mixers, etc.

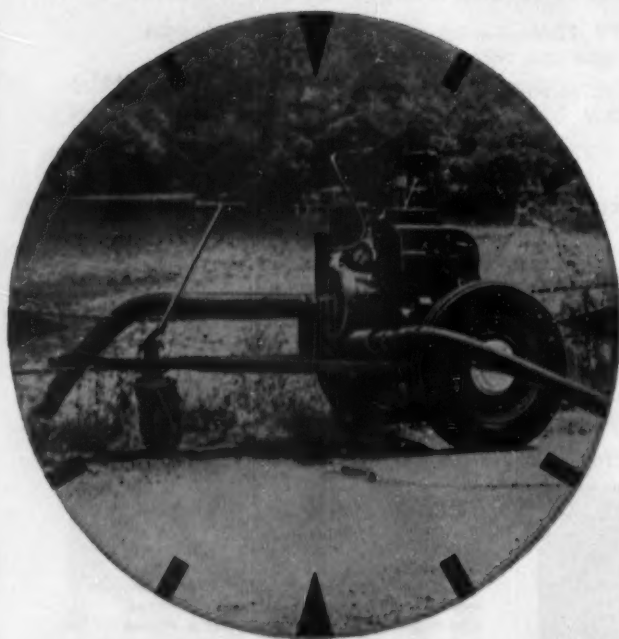
NEW! Long Life—the C2-90 is a ruggedly built industrial engine specially designed to outlast any other engine on the market.

NEW! Cooling Design—to avoid overheating that comes with dust conditions, the C2-90 provides improved cooling surfaces, a cooling fan that operates through entire speed range, and pre-cleaners.

NEW! All-Weather Performance—the C2-90 advanced air-cooled design performs normally in extremes of heat and cold.

In addition, this short-stroke, oversquare engine has the advantage of modern, high-speed operating ranges.

Specifically designed construction equipment accessories are available: gear-driven hydraulic pump; front-end power take off; various power take-off adaptations, i.e., pulley drives and various reductions for engine and anti-engine rotation.



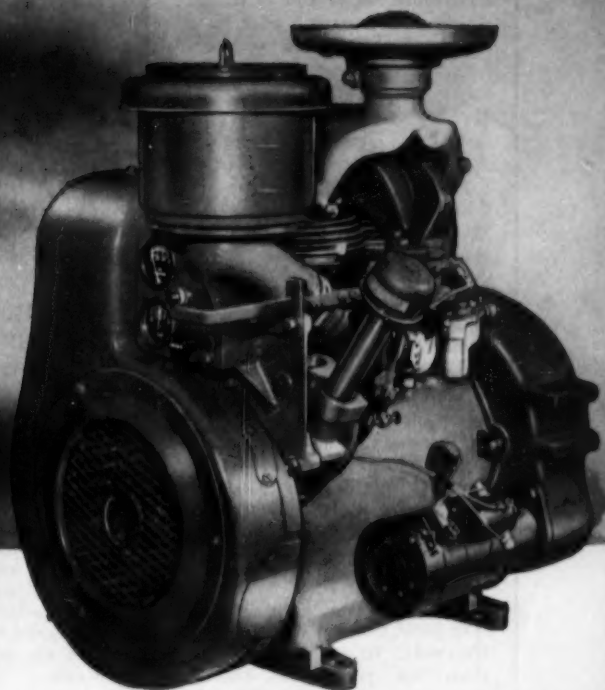
RUN FOR MORE THAN 1,600 CONTINUOUS HOURS! In Williamsport, Pa., this C2-90 was test-run in an actual pumping application for more than 1,600 hours continuously, without overhaul or any service except gas and oil. The engine is still in active service as a demonstrator.

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For more details write to Sales Engineering, Industrial Engines, Lycoming Division of AVCO, Williamsport, Pa.

SOON TO COME! New opposed twins, opposed 4's and V-4's for all applications up to 75 h.p.

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COMMENT

from the

BUTLER ENGINEER

On ancient history . . . and planning big futures

Interesting historical items: in Baltimore a Butler customer doing an excavating job opened up a perfect maze of old tunnels. No one seems to know when they were built or what for . . . And in constructing the new Brooklyn Dry Dock they ran into a slew of mahogany logs 50 to 60 feet under water. They're estimated to be 70 or 80 years old. Don't ask me how they got there.

Despite this country's enormous productivity we still build too small. We're still plagued with steel and cement shortages . . . our new hospitals are overcrowded almost as soon as they're built. New schools? Same thing. New airports? Same thing. Moral: Don't let it happen to you when you build your Ready Mix Plant. Don't approach the problem with "Can we do with smaller equipment?" Look ahead. Analyze your market today and for the years to come. And even then "up" your thinking!

Expansion of an existing plant is expensive. Build your "expansion" in at the start.

Another good reason for building big: it keeps out competition. A prospective competitor looks over your market, sees your plant and says, "These boys must really dominate this area. Look at the size of their plant. We'd better not try to buck them!"

That's not theory, it's fact. Many of our customers have given actual case histories.

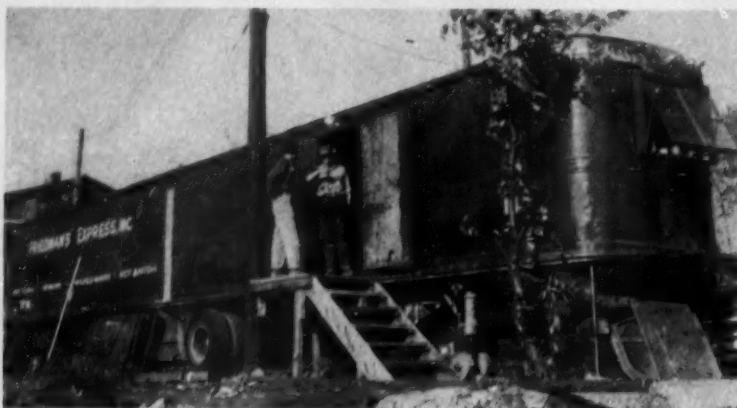
Here's something else that pays off handsomely: call in the Butler Engineer early in your planning for a Ready Mix or Concrete Products Plant. Give him time to study and plan. It will pay.

Now I'll get off the pulpit.

The Butler Engineer

BUTLER BIN COMPANY
WAUKESHA, WISCONSIN

Job Talk... Along the Pennsylvania Turnpike



Trailer Makes Good Parts Shop

BIG TRAILERS make excellent parts shops. They hold thousands of units, move intact, and relocate quickly. On site, contractor connects them for greater capacity. Parts manager has office in trailer in which he maintains radio contact with key foremen. Needed parts are sent out at once.



50-Ton Trucks Are Simple to Operate

Giant Euclid end-dump trucks that carry 50-ton loads are almost as easy to operate as the family automobile, according to Central Pennsylvania Quarry and Stripping Co. The contractor is working a fleet

of ten 10-wheel units with a 6-yd shovel near Lehigh, Pa. Chief reason for the rig's smooth operation is its Allison torque converter-transmission team. It provides

(Continued on page 11)

ANOTHER TURNPIKE

goes NORTHWEST!

42 NORTHWESTS on the MASSACHUSETTS TURNPIKE — more than any other make!

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ON THE WEST VIRGINIA TURNPIKE
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Grove, Ludin & Cox	3 Model 80D's
D. Cutrupi & Sons	1 Model 80D
Grandview Constr. Co.	2 Model 80D's
Henley-Lundgren Co.	1 Model 6
	2 Model 80D's
Berlanti Constr. Corp.	2 Truck Cranes
	2 Model 6's
	2 Model 80D's
Nello-Teer	1 Model 80D
L. G. Defelice & Son	2 Model 80D's
Clark-Farrell-Rogers	1 Model 80D
S. J. Groves & Sons	1 Model 25
	1 Model 80D
Elmhurst Contracting	3 Model 80D's

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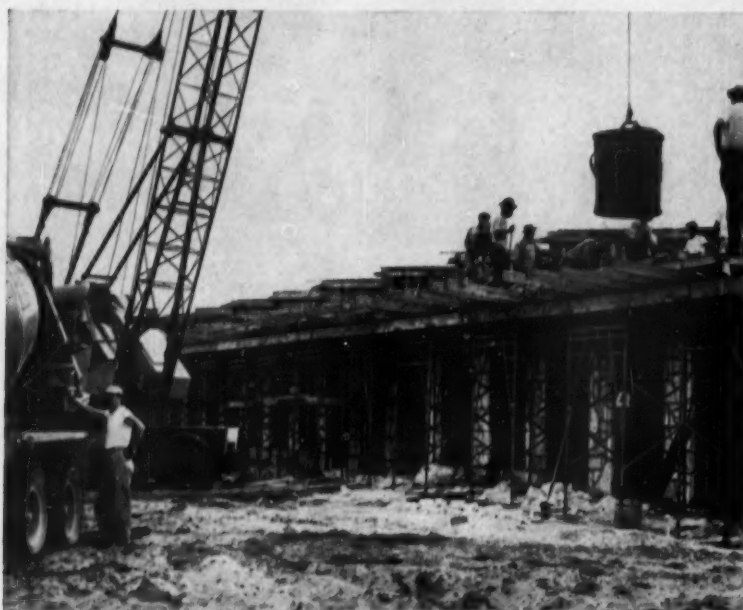
Scaffolding Methods . . . by Patent Scaffolding Co.



WITHIN EASY REACH—Separate 20"-wide platform, laid on sidewall brackets attached to "Trouble Saver"® Sectional Steel Scaffold, keeps materials easy to reach and man at most convenient working level. General contractor Damon G. Douglas uses this equipment for new elevator shaft at Hyatt Roller Bearing plant in Harrison, N. J.



OVER AND OUT—To remove cornice stones on an 18-story New York City building without disturbing a 6-ft. parapet wall, J. H. Taylor Construction Co. uses "TubeLox"® tube and coupler Scaffolding and cantilevered it 6 ft. beyond the wall. Steel cables, supporting a hanging, two-level "TubeLox" Scaffold below the cornice, run up over the framework and are anchored to the roof.



CONCRETE SHORING—Forms for the entire roof and all girders on the Northwest Dade Junior High School, Miami, are shored with 5'-wide "Trouble Saver" and frames, varying in height from 3' to 6'6". U-heads and extension legs in frame legs speed the installation of stringers. Thompson-Polizzi Construction Co., Miami, is the general contractor on this project. "Trouble Saver" Shoring, in addition to cutting shoring costs, provides a ready-made scaffold for stripping of forms or removing pans.



SEATTLE STONE—Four-story addition to the Bon Marche building in Seattle is faced with local cast stone by Bennett Campbell, Inc., general contractor. 88 6'6"-wide "Gold Medal"® Suspended Machines are used to scaffold two sides at a time.

To help you with your scaffolding and concrete shoring methods, PS offers a complete nation-wide engineering service available to you locally. See the Yellow Pages in your 'phone directory for the nearest Patent Scaffolding office or representative that sells and rents "Gold Medal" Scaffolds.

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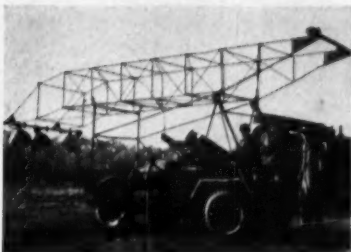
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JOB TALK . . . Continued from page 8

finger-tip control at full throttle, and absorbs shock to the engine. But it requires care. In particular, Central Penn instructs its drivers to avoid fast starts from a standing position. They greatly accelerate wear on seals.



Light Tower on Jeep . . .



... Folds for Moving

By mounting light towers on Jeeps, a contractor has solved the problem of mobile illumination on a rugged section of the Northeastern Extension of the Pennsylvania Turnpike. Badgett Mine Stripping and Construction Co. is working two 9-hr shifts every day, and they need plenty of light at night to keep their rigs operating at top efficiency. The contractor uses four towers to cover the job. Six lamps mounted on top are supplied with electricity from a generator connected to the Jeep's power take-off. When the unit has to move, the lightweight pipe tower is pivoted back by hand until it is seated on a frame built above the Jeep. The units provide adequate illumination, and can move anywhere fast.

NEW **Ramset®**

EXCLUSIVE DUO-JOBMASTER



INTERCHANGEABLE
on the job

Just twist—unscrew; that's all you do!

Here's the answer to maximum versatility in powder-actuated tools—**TWO TOOLS IN ONE**, with both $\frac{1}{4}$ " and $\frac{3}{8}$ " barrels, interchangeable on the job. Operator carries with him the tool, extra barrel, fasteners and charges . . . sets $\frac{1}{4}$ " and $\frac{3}{8}$ " studs *with the same tool* merely by switching barrels.

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takes out one barrel and puts in the other. Barrel not much bigger than a fountain pen.

This is the time-proved, job-proved **RAMSET® JOBMASTER** with this new added convenience. Still **FIRST** in powder-actuated fastening—imitated but never equaled.

Write for new catalog which shows complete line of **RAMSET** fasteners, tools and charges. Sent free.

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OLIN MATHIESON CHEMICAL CORPORATION

FIRST IN POWDER-ACTUATED FASTENING

12103 BERE A ROAD

CLEVELAND 11, OHIO



7 important Dumptor advantages

Take another look at the latest model Koehring 6-yard Dumptor shown here. It has some important features worth checking. Notice how heavy snubber-spring on steering axle cushions road shocks — yet retains Dumptor's unique advantage of no spring maintenance. There are no leaf springs. Big shock-absorbing drive tires eliminate need for springs on the drive axle.

Alignment of drive wheels with steering wheels adds to efficiency of Dumptor no-turn shuttle hauling — makes a big difference in traction and flotation when Dumptor is shuttling back and forth across loose stockpiles, soft ground.

Another basic Dumptor advantage is instant gravity dump. It's controlled by a simple body latch and new dump lever

arrangement. Gravity dumping eliminates slow-acting, troublesome body hoists — never balks, never wears out. Notice, too, the new streamlined, all-steel body. Even with all this heavy-duty strength, Dumptor still has more than 6 h.p. for every ton of loaded weight. It accelerates fast, pulls through soft ground and up grades with less shifting — climbs 24% grades fully loaded.

Let your Koehring Distributor give you all the latest Dumptor® facts. See him soon, or write.

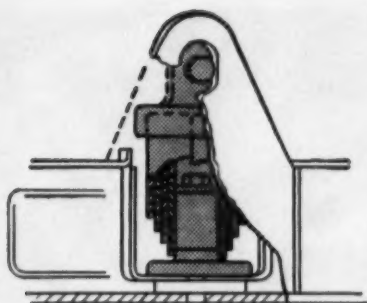
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MILWAUKEE 16,
WISCONSIN



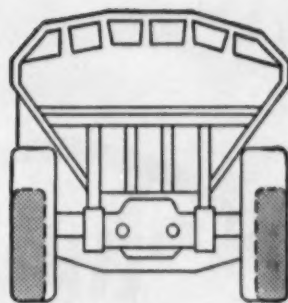
Subsidiaries: PARSONS
KWIK-MIX • JOHNSON

K437



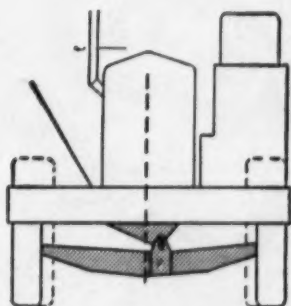
Smooth ride

Heavy, snubber-type spring is mounted between Dumptor main frame and the steering axle. Shock-absorbing action provides plenty of "cushion" — takes all the jolts out of rough, off-road travel. Easy on operator and machine.



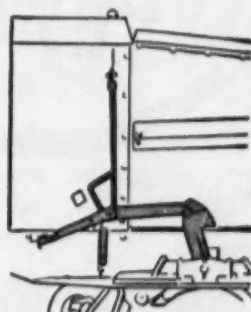
Tires track in direct line

Wider, heavier steering axle puts Dumptor steering wheels in direct line with big drive wheels. Tires track in the same path. There's less rolling resistance, better traction in soft ground, and on rough haul roads.



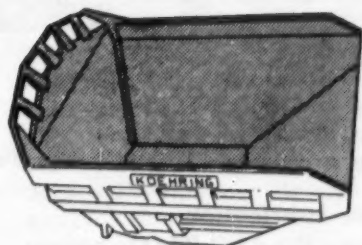
Off-set pivot on axle

Pivot point on steering axle is off-set from center line $3\frac{1}{4}$ " toward operator side of machine. There's no sag, even with unbalanced load. Steering axle oscillates up to 21" — keeps twisting strains out of Dumptor main frame.



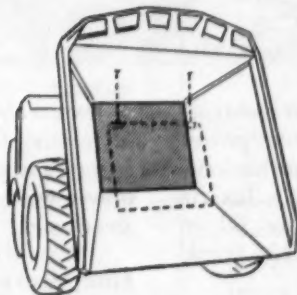
New body-latch, dump lever

Body latch for 1-second gravity dumping is simple, trouble-free. Latch is engaged by a single hook, mounted on the chassis frame. Dump lever is located inside the cab, in an easy-reach position to left of operator.



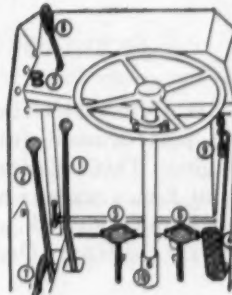
Streamlined, all-steel body

Inside is free of bulges or ledges. Top edge is box-beam constructed. Sides, ends are ribbed with 5 and 8" channels. Double-plate bottom is lined with multiple steel beams. Note ridge bar added to sturdy rock-guard teeth.



Bolted or free-swinging pan

Heavy steel kick-out pan is $\frac{1}{2}$ " thick. Pan can be bolted to body floor for extra protection when loading rock. Remove bolts, and pan has free swinging kick-out action — breaks suction when dumping wet or sticky materials.



Easy-reach controls:

(1) Speed gear shift lever, (2) directional gear shift lever, (3) starting aid, (4) foot throttle, (5) clutch pedal, (6) brake pedal, (7) parking brake, (8) body-release lever, (9) hand throttle, (10) running lights control switch.

THE TOUGH JOBS GO TO TEXACO



ROUGH AND TOUGH conditions on construction jobs demand full, dependable power from engines. This calls for effective lubrication—and so all Eimco tractors are completely Texaco-lubricated and shipped with a factory fill of *Texaco Ursa Oil Heavy Duty* in their diesel crankcases.

As contractors everywhere know, this Eimco recommendation for its own equipment is equally good for all diesel and heavy duty gasoline engines.

Texaco Ursa Oil Heavy Duty is one of the complete line of famous *Texaco Ursa Oils*—especially refined and processed to make engines deliver more power with less fuel over longer periods between overhauls.

Other Lubrication

Eimco also uses *Texaco Regal Oil R&O* to prevent sludge, rust and foam in hydraulic systems. *Texaco Track Roll Lubricant* to assure long roller life. *Texaco Marjak* to protect chassis bearings against

TUNE IN . . .
TEXACO STAR THEATER
starring
JIMMY DURANTE
on television . . .
Saturday nights, NBC.



TEXACO



wear and rust. Texaco gear lubricants for transmissions and differentials.

A Texaco Lubrication Engineer will gladly help you select the proper lubricants for your equipment. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

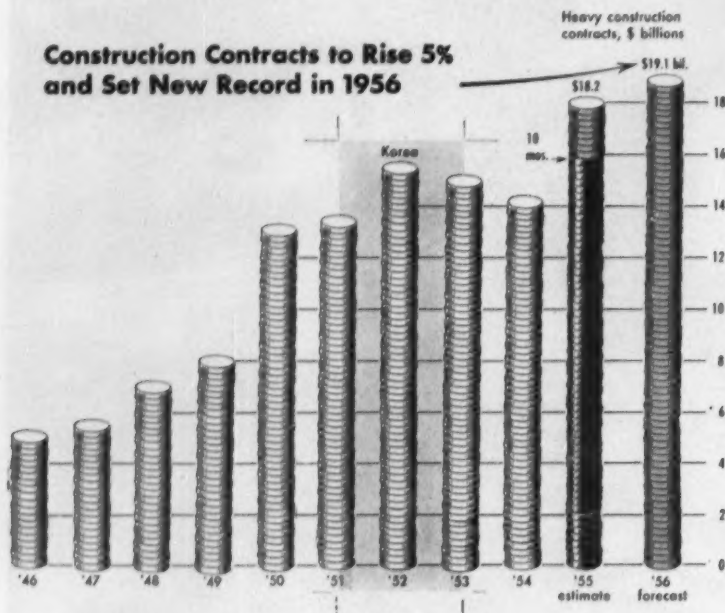
THE EIMCO CORPORATION, Salt Lake City—one of the West's oldest and largest manufacturers of heavy mining and industrial equipment—has been a Texaco user for years. Not only are Texaco lubricants used throughout its manufacturing operations, but all new Eimco Model 105 tractors are delivered factory-filled with Texaco lubricants.

Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

It's Your Business . . .

Construction Contracts to Rise 5% and Set New Record in 1956



New Highs Forecast in '56 for Highways, Waterworks, Earthwork & Waterways and Commercial Building

Type of Work	Estimate (projection of 10-mos. total)	Preliminary forecast	% Change '55-'56
	1955	1956	
Millions			
All construction	\$18,152	\$19,055	+5
Private	11,196	11,185	-0.1
Public	6,956	7,870	+13
State & municipal	5,315	5,590	+13
Federal	1,641	1,880	+15
Public			
Waterworks	270	300	+11
Sewerage	405	405	0
Bridges	489	585	+20
Highways	2,180	2,550	+17
Earthwork, waterways	522	600	+15
Building, excl. housing	1,732	1,850	+7
Housing	280	280	0
Unclassified	1,078	1,300	+21
Private			
Housing	6,013	5,600	-7
Commercial	1,603	1,685	+5
Industrial	2,705	3,100	+15
Unclassified	875	800	-9

Contractor New Business in 1956 to Top This Year's Record Total

THE BOOM IN HEAVY CONSTRUCTION contracts is headed for still higher ground in 1956. CM&E's preliminary forecast for next year is that contract volume will rise to a new all-time high of \$19.1 billion. This is a 5% increase over the 1955 total, estimated at \$18.2 billion on the basis of the record \$15.7 billion in awards during the first 10 months.

Contractor business is forecast to hit new highs next year for highways, up 17%; waterworks, up 11%; earthwork and waterways, up 15%; and commercial building, up 5% (see table). Other major types of heavy construction which will increase but without setting new records are: bridges, up 20%; public unclassified, up 20% (this category is largely federal airport and military construction and municipally owned electric and gas utilities); private industrial building, up 15%; and public building other than housing, up 7%.

Sewerage awards and public-housing contracts are expected to hold at the same level as this year. In contrast, declines in 1956 awards are forecast for private mass housing, down 7%; and private unclassified, down 9% (mainly pipelines and transmission lines).

While the construction contract outlook as a whole is excellent for next year, contractors will continue to face spot shortages and slow deliveries of materials and equipment. Cement, structural and reinforcing steel will be the major materials problems next year.

Contractors should also keep in mind when bidding on next year's work that the sellers' market could make materials prices sensitive to another round of wage increases and to the higher costs of full capacity and overtime production schedules.

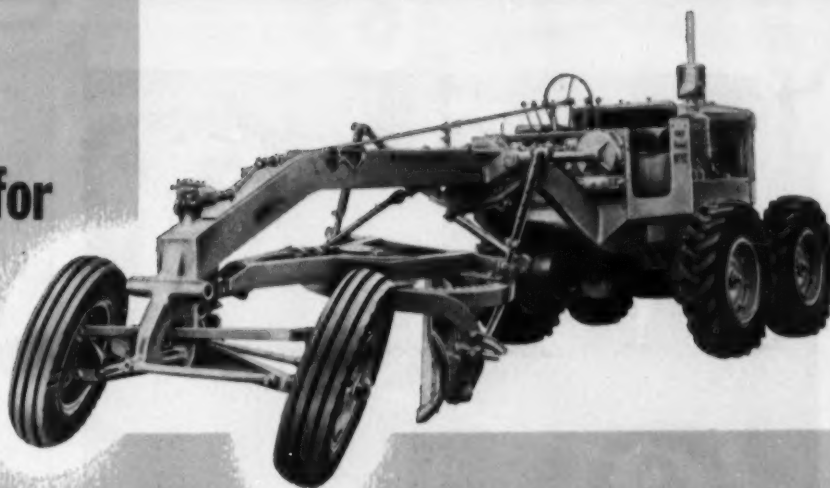
Record Volume of Work in Planning Stage

Backing up this forecast of a continued boom next year is the staggering amount of new heavy construction projects proposed this year. During the first nine months of 1955 alone, CM&E reported projects with an estimated cost of \$18 billion as going into the planning stage. This is 54% more future work than was reported proposed in the first nine months of 1954 and tops by a wide margin the total value of projects proposed in all 12 months of 1952, 1953, and 1954.

Though projects have been moving out of CM&E's backlog of proposed work into contract in record-breaking volume this year, the flow in of new proposed work has been far greater. This has caused the backlog to mushroom faster than ever. As of September 30, it reached a record \$89.4 billion, more than four and one-half times total contract volume estimated for 1955. Since September, 1954, this backlog has climbed 15% for a net increase of \$11.5 billion, the largest 12-month gain in history.

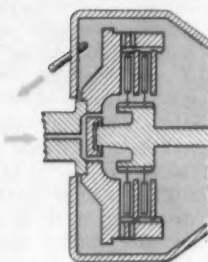
(Continued on page 18)

Exclusive
new oil clutch for
CAT* No. 12
Motor Grader
can give you

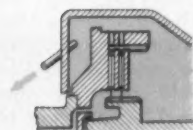


1500 HOURS without clutch adjustment

How the new oil clutch works



Crankcase oil is directed, under pressure, into clutch compartment through holes in flywheel. It is circulated by centrifugal force and returned to the crankcase by the flywheel ring gear. When the clutch is disengaged, cool oil surrounds the specially bonded cork facings.



As clutch discs move to engaged position, facings are "oil protected." Once engaged, they are completely free of oil.



Cork facings have a network of grooves that enable oil to escape during engagement. Oil constantly lubricates all moving parts.

Extensive tests have shown that clutch facings wear an average of only $2\frac{1}{2}$ thousandths of an inch per thousand hours of operation with the new oil clutch for the Caterpillar No. 12 Motor Grader. Here are four good reasons why this new oil clutch can mean lower cost, better performance on *your* job:

1 LONG LIFE: new clutch facings greatly extend clutch life by reducing slippage. This is possible because of the high frictional qualities of the bonded cork facings. Since the clutch runs in oil, constant "oil bath" lubrication cuts wear on moving parts.

2 GREATER EFFICIENCY: clutch action stays smooth and "like new." Clutch "fade" due to overheating is practically eliminated, since facings are kept cool by engine oil.

3 EASY MAINTENANCE: nine months without clutch adjustment is not unusual in road maintenance work. Constant oil splash makes ordinary lubrication for clutch or throwout bearings unnecessary.

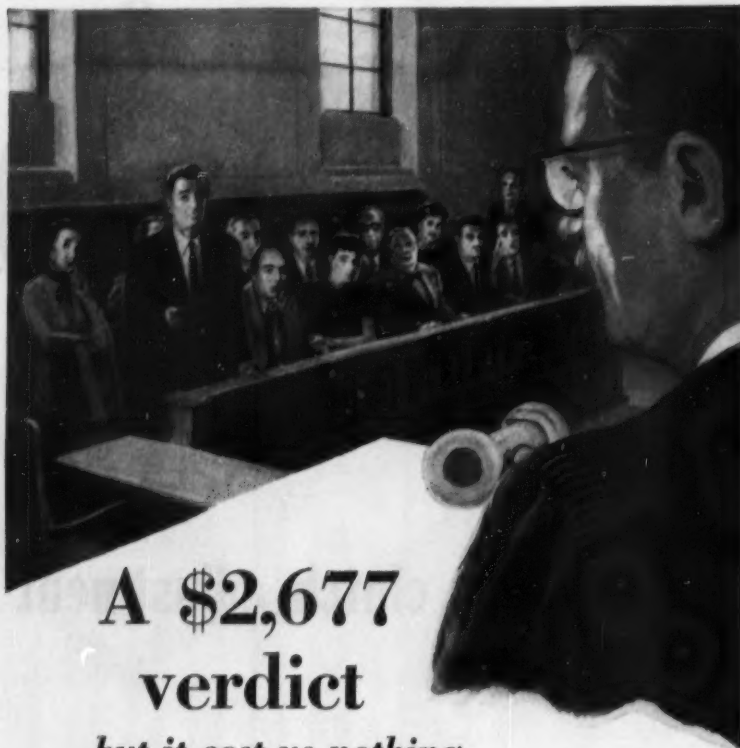
4 JOB PROVED: in exhaustive, on-the-job tests, this exclusive oil clutch in the No. 12 has delivered the same efficient, reliable performance as the thoroughly proved oil clutch on Caterpillar track-type Tractors.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

**99% OF ALL
CAT MOTOR GRADERS
ARE STILL IN USE**



A \$2,677 verdict

... but it cost us nothing

(Based on Company File #71L8540)

One of our men had been injured while doing a contract job we handle for a public utility company. It was months before he could work again.

Of course, he got Workmen's Compensation. But, not satisfied with that, he sued the utility company for \$25,000 damages.

The court awarded him \$2,677, which the utility's insurance carrier paid. And then we got a surprise. The utility's insurance company sued us to recover the money! Their claim was based on a "hold

harmless" clause in our contract with the power company.

They won their case. The verdict could have cost us \$2,677 plus considerable legal expense. However, our Hartford Agent had been careful to write our Liability insurance to include proper coverage for contractual liability exposures.

That's why we had no problem. The Hartford Accident and Indemnity Company handled the whole situation for us. They defended the suit . . . paid the loss . . . met all legal costs.

Unusual and complex phases of insurance constantly crop up in today's business relationships. You have to be prepared for them.

Make it a point to have your Liability insurance requirements handled through a thoroughly experienced insurance agent or broker. He will be alert to such technical angles as contractual liability exposures. And he will wisely place your policies in a company experienced in providing Liability protection in all its varied forms.

For competent, dependable insurance service, see your Hartford Agent. Or tell your insurance broker you want Hartford coverage.

Year in and year out you'll do well with the

Hartford



Hartford Fire Insurance Company
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Hartford Live Stock Insurance Company
Citizens Insurance Company of New Jersey . . . Hartford 15, Connecticut
Northwestern Fire & Marine Insurance Company
Twin City Fire Insurance Company . . . Minneapolis 2, Minnesota

IT'S YOUR BUSINESS . . .

Continued from page 16

As long as new work continues to go into the planning stage in much greater volume than projects move out into contract, contractors can expect increasing pressure for a higher volume of contract awards.

Proposed Public Work Shows Biggest Gain

So far this year, nearly all types of work are piling into the planning stage in much greater volume than last year. The biggest gains are in public works.

Earthwork and waterway projects to cost \$2,107 million were reported proposed in the first nine months of 1955, 322% more than last year. This total includes California's Feather River flood control and power dam to cost \$1.5 billion (for which contracts are expected to be let after 1956.)

The value of proposed bridges shot up 174% to \$624 million, while highway projects jumped 85% to \$3,542 million. The highway total includes Massachusetts' \$1-billion, 10-year highway program plus several big toll road and expressway projects. Waterworks projects going into the backlog scored a whopping 126% increase to \$441 million in the first nine months of 1955. However, sewerage volume of \$292 million is about the same as in 1954. Public buildings valued at \$2,183 million have been proposed to date, 31% more than in 1954, and public unclassified work has come along in 59% greater volume, totaling \$933 million.

Private proposed work is going into the backlog faster than in 1954 for all major types except unclassified, which has dropped off 37% from last year's high volume. Industrial buildings are up 46% to \$2.8 billion, and commercial buildings are up 10% to \$1.6 billion. Private mass-housing has racked up a 72% increase to \$2.4 billion.

HEAVY CONSTRUCTION BACKLOG

As reported by CM&E in \$millions, Sept. 30

Type of work	1954 In millions	1955 In millions	% chg '54-'55
All heavy construction	\$77,927	\$89,442	+15
Waterworks	1,599	1,915	+20
Sewerage	2,931	2,976	+2
Bridges	2,370	2,795	+18
Highways	8,508	11,220	+32
Earthwork, waterways	8,940	11,114	+24
Public building	14,726	15,889	+8
Industrial building	11,397	13,062	+15
Commercial building*	12,333	14,818	+20
Unclassified	15,121	15,653	+4

* Includes private mass housing



Fast, efficient Whitman Power Buggies poured 33,000 yds. of concrete on bridge, running on movable platforms.



Double waters are hauled to front of forming operations on Whitman flat bed Power Buggies to speed lay.



Here a Whitman Power Buggy pulls a trailer load of reinforcing bars from supply depot on bridge to forming crew.



Portable runways were built ahead over mud to let Buggies deliver materials anywhere. Here a Buggy hauls a trailer.

big bridge job proves **VERSATILITY** of *Whitman* **POWER BUGGIES**



Building New York's three mile long, six lane Tappan Zee bridge in record time was possible to a large extent through the ingenious use of 14 Whitman Power Buggies. These fast, rugged, tireless workers not only placed 33,000 yards of concrete, but proved their amazing versatility by also hauling lumber, forms, reinforcing steel, and innumerable other materials — keeping the job rolling at a speedy pace.

Consider the many material-handling jobs that Whitman Power Buggies can do for you faster, more efficiently, more economically. Three body types for various needs. Or we will design a special body to meet your particular requirements. Call your Whitman distributor or send coupon today.

Joint general contractors for the dock work: Guilford Construction Co., West Shore Concrete Co., and Euclid Contracting Corp. Whitman Power Buggies supplied by Contractors Supply Corp. Photos courtesy Construction Methods & Equipment.

TRADE MARK

Whitman

THE LEADER
IN CONCRETE
EQUIPMENT

WHITEMAN MANUFACTURING CO., DEPT. C
3249 Casitas Ave., Los Angeles 39, Calif.
Please send prices, catalogs and name of distributor for:
☐ Power Buggies ☐ Screeding Machines ☐ Vibrators
☐ Floating-Finishing Machines ☐ Truck Mixers.
Name _____
Firm _____
Address _____
City _____
Zone _____ State _____



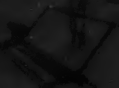
POWER BUGGIES



FORMS



SCREEDING MACHINES



FLOATING-FINISHING MACHINES

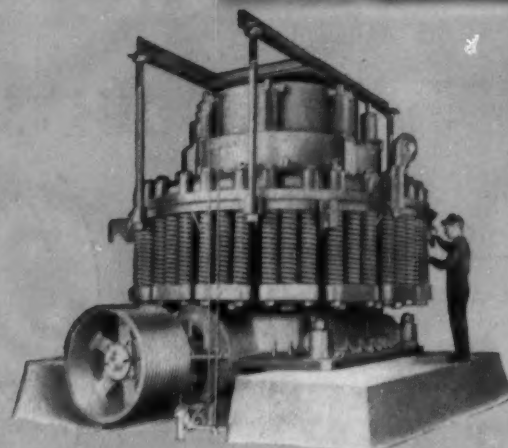


TRUCK MIXERS

SYMONS

CONE CRUSHERS

Produce
Aggregate and Sand
to the Rigid
Specifications of
the Construction
Industry



SYMONS Cone Crushers . . . the machines that revolutionized crushing practice . . . are built in Standard, Short Head, and Intermediate types, with crushing heads from 22 inches to 7 feet in diameter—in capacities from 6 to 900 tons per hour.

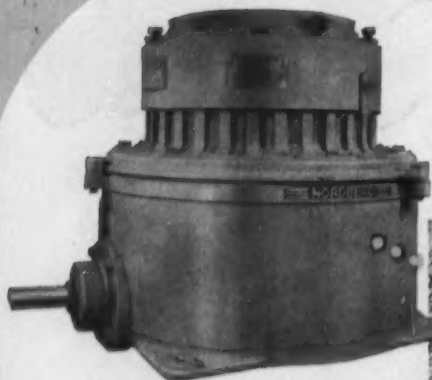
To meet the constant demand for vast tonnages of specification concrete and bituminous aggregates and quality sand, the construction industry today depends on Symons Cone Crushers, long the first choice of leading producers and used throughout the world in the construction of dams and hydro projects, highways, bridges and commercial and residential buildings.

For in aggregate and sand production . . . as in all of the great ore and industrial mineral operations the world over . . . there has been no record to equal the performance of Symons Cone Crushers that have so consistently and efficiently produced great quantities of crushed product at low cost.

Whether you are a contractor, operator, construction engineer, designer or manufacturer, it will pay you to specify and use Symons Cone Crushers . . . as well as the other Nordberg Machinery for the construction industry . . . all designed and built to deliver maximum output at lowest possible cost.

Write for literature on the machinery you need.

NORDBERG MFG. CO., Milwaukee, Wis.



Long accepted by experienced contractors and producers for efficient stationary crushed aggregate plants, increasing numbers of successful operators of portable and semiportable crushing plants are now using these sturdy, economical Symons Cones for big capacity of fine product . . . such as this Cedarapids Model 30 C Portable Cone Crusher Secondary Crushing and Screening Plant, utilizing a 30" Symons® Intermediate Cone Crusher as standard equipment.

SYMONS . . . A REGISTERED NORDBERG TRADEMARK KNOWN THROUGHOUT THE WORLD

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NORDBERG



MACHINERY FOR PROCESSING ORES and INDUSTRIAL MINERALS

NEW YORK • SAN FRANCISCO • DULUTH • WASHINGTON
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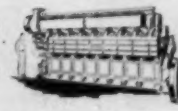
SYMONS
VIBRATING
SCREENS



SYMONS
VIBRATING
GRIZZLIES

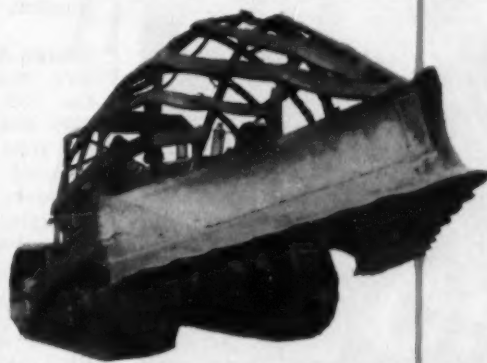


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ENGINES . . .
10 to over
12,000 H.P.



GULF PRODUCTS *and* FINE SERVICE

keep equipment rolling on Georgia Dam Project



Wade Lahar Construction Company, Mountain Home, Arkansas, have been awarded the U.S. Engineers Contract for clearing 23,500 acres at Buford Dam, Buford, Georgia, a multi-million dollar project. Note the special cutter and safety canopy which were designed by Mr. Wade Lahar, President, to cut down trees even with the ground. Gulf products are helping this contractor stay well ahead of schedule on this big project.



With higher than ever operating costs threatening every dollar of your profits, it will pay you to take stock of the advantages Gulf offers as a supplier of petroleum products.

Advantages like these, for example: Prompt delivery service from close-at-hand distribution points; quality lubricants that provide an extra margin of protection against mechanical delays; fuels that insure top engine performance; and helpful petroleum engineering counsel.

You will find, as have so many leading contractors—ask the Wade Lahar Construction Company, for example—that these advantages add up

to smoother operation, greater production, and lower maintenance costs.

Send the coupon for a copy of Gulf's new brochure, "Gulf and Your Business."



Gulf Oil Corporation • Gulf Refining Company
1822 Gulf Building, Pittsburgh 30, Pa.

CM

Gentlemen:

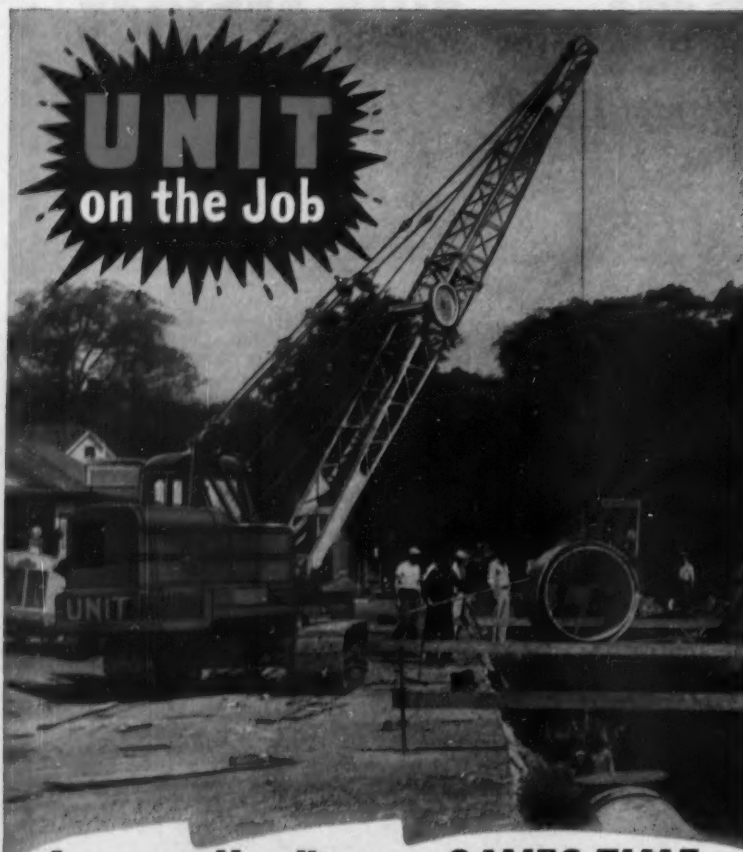
Please send me a copy of your new brochure, "Gulf and Your Business."

Name

Company

Title

Address



Accurate Handling... SAVES TIME

This sturdy UNIT Crawler Crane offers plenty of power plus accurate control. Spots heavy sewer pipe perfectly into the desired position. Adjustable Hook Rollers, Extra Long Crawlers and Wide Multiple Hinged Crawler Shoes provide all-around stability. Full Circle Swing, controlled from within UNIT'S FULL VISION CAB, provides safe and efficient operation. The operator has a complete view of the entire job at all times. GET THE FACTS! Investigate this modern UNIT and its many features. Write today for literature.

UNIT CRANE & SHOVEL CORPORATION
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**1/2 or 3/4 YARD EXCAVATORS... CRANES UP TO 20 TONS CAPACITY
CRAWLER OR MOBILE MODELS... GASOLINE OR DIESEL**



All Models Convertible to ALL Attachments

SOME BIG CONTRACT AWARDS OF THE MONTH

Stone & Webster Engineering Corp., Mellie Esperson Bldg., Houston, Tex. Ethylene plant at Sweeny, Tex., for Phillips Chemical Co., City National Bank Bldg., Houston, Tex. \$10,000,000.

George A Fuller Co., 597 Madison Ave., and **The Walsh Construction Co.**, 122 E. 42nd St., New York City. 650,000 sq. ft brick, concrete and steel manufacturing plant and railroad facilities at Barrington, Camden, N.J. for Owens-Corning Fiberglas Corp., Nicholas Bldg., Toledo, Ohio. \$18,000,000

Caristo Construction Corp., 26 Court St., Brooklyn 2, N.Y. Aviation Trades High School, Queens Blvd., 47th Ave., 35th and 36th Sts., Long Island City, N.Y. for the Board of Education, Bureau of Construction, 42-15 Crescent St., Long Island City 1, N.Y. \$4,267,000.

Vinnell Co., Inc., and **Vinnell Constructors**, 1145 Westminister Ave., Alhambra, Calif. Grading and surfacing 2.4 mi., six bridges and three pedestrian undercrossings on Golden State Freeway, Los Angeles, Glendale and Burbank, for State Division of Highways, 120 S. Spring St., \$4,040,782.

Biltman Construction Co., 101 Park Ave., New York City. Delano Village, eight 16-story apartments, New York City, for the New York Harlem Estates, Inc., 202 Lexington Ave., New York City. \$16,500,000.

Ebasco Services, Inc., 2 Rector St., New York City. Design and supervise construction chemical cellulose plant at Jesup, Ga. for Rayonier, Inc., 161 E. 42nd St., New York City. \$25,000,000.

Bethlehem Steel Corp., E 3rd St., Bethlehem, Pa. Superstructure Mississippi River bridge crossing the greater New Orleans Bridge over the Mississippi River for the Mississippi River Bridge Authority, Room 422, City Hall Annex, New Orleans, La. \$12,268,580.

United Engineers & Constructors, Inc., 1401 Arch St., Philadelphia, Pa. Design and construct electric power generating plant, Millsboro

(Continued on page 28)

HERE'S

*more
performance*

*more
versatility*

*more
dependability*

**than you've ever seen
in a 45-drawbar-hp tractor!**

more performance . . .

FOR SUSTAINED HIGH OUTPUT!

more versatility . . .

FOR A WIDER RANGE OF WORK!

more dependability . . .

FOR LOWER JOB COSTS!

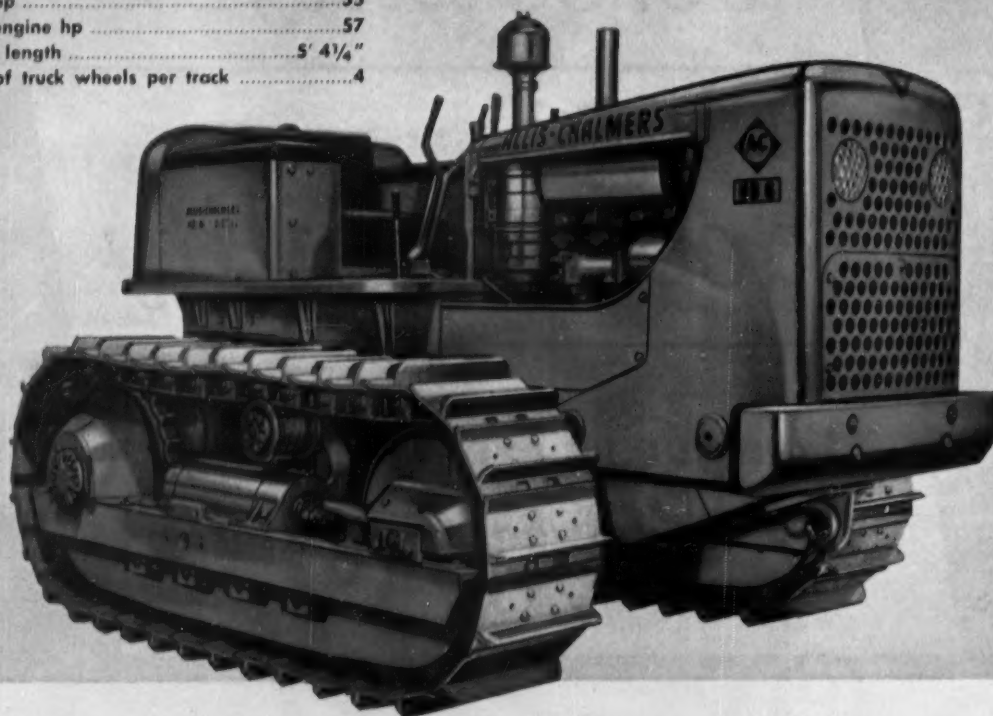
TWO NEW

HD-6

BULLDOZER-DRAWBAR TRACTOR

. . . an all-round tractor balanced for outstanding performance with both mounted and drawn equipment.

Weight	12,400
Drawbar hp	45
Belt hp	55
Net engine hp	57
Track length	5' 4 $\frac{1}{4}$ "
No. of truck wheels per track	4



**WITH ALL THE IMPORTANT PERFORMANCE ADVANTAGES
OF ALLIS-CHALMERS ADVANCED BASIC DESIGN . . .
tested and proved over millions of operating hours!**

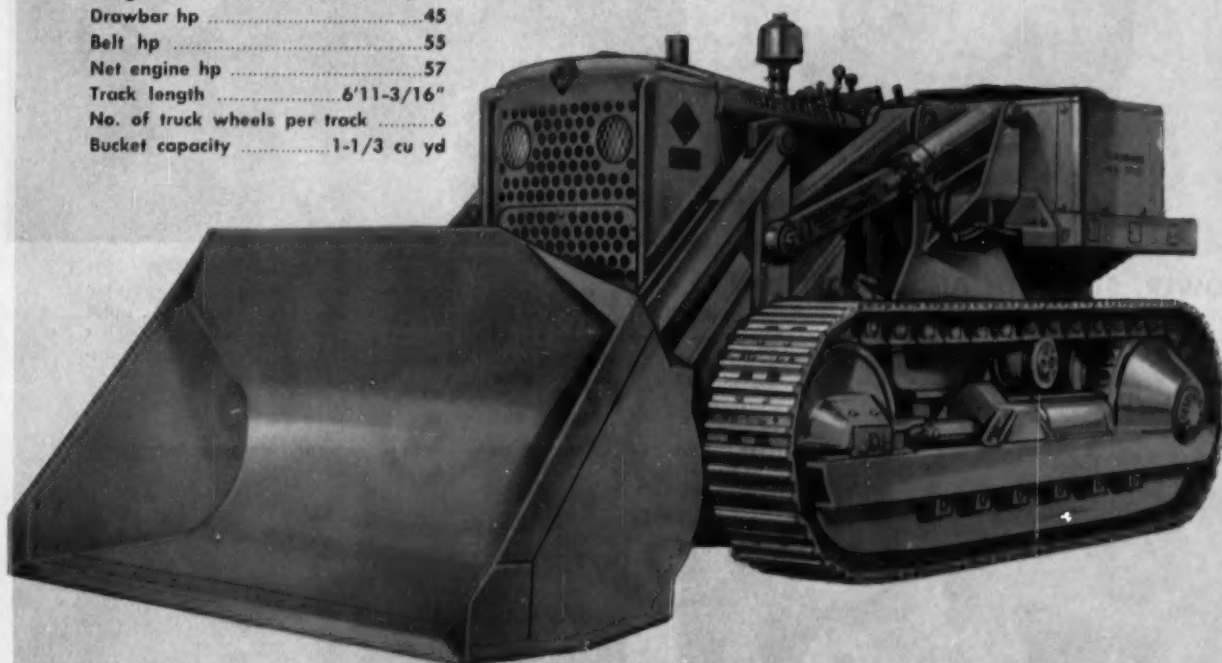
ALLIS-CHALMERS ANNOUNCES HD-6 SERIES TRACTORS

HD-6G

TRACTOR SHOVEL

... with the shovel a "built-in" part of the tractor — not just an attachment.

Weight	19,600
Drawbar hp	45
Belt hp	55
Net engine hp	57
Track length	6'11-3/16"
No. of truck wheels per track	6
Bucket capacity	1-1/3 cu yd

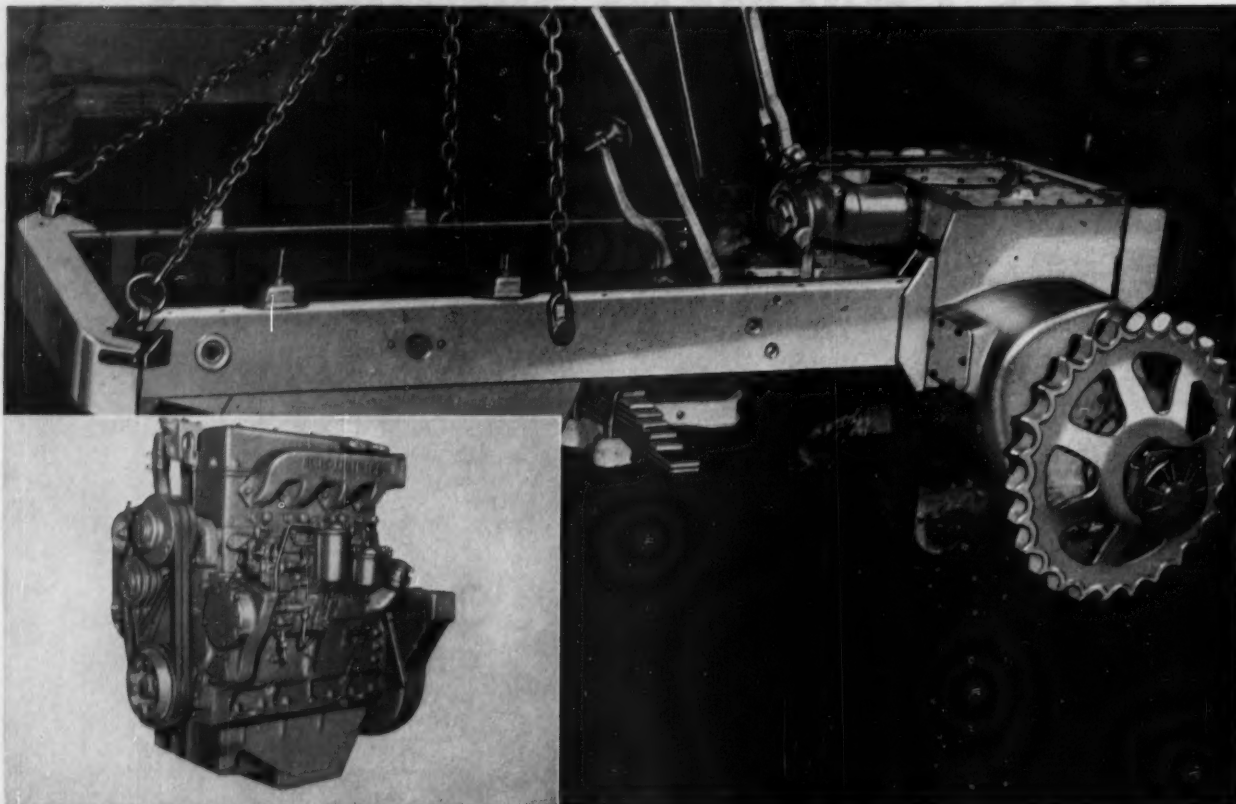


The HD-6 series represents the most advanced engineering in the tractor business — not just in features, but in *basic design*. That means plenty of power, balance throughout the tractor, strength in *all* components, weight in the *working* parts where it does the most good, and big safety factors. It also means engi-

neering for the use of mounted equipment, and for easier, better operation and maintenance.

Following are just a few of the many features that reflect this advanced basic design . . . help to bring you higher production, more work done . . . lower job costs.

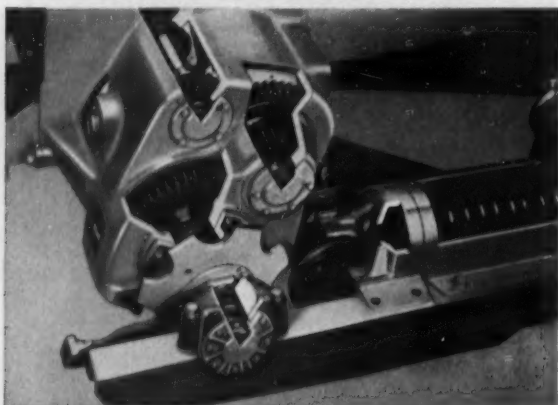
Inside Facts on NEW ALLIS-CHALMERS HD-6 SERIES TRACTORS



POWER, STRENGTH AND PROTECTION

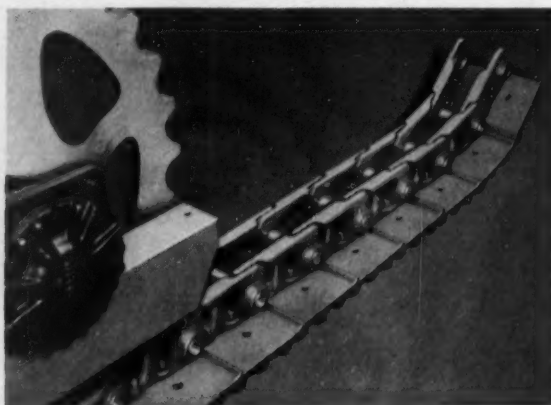
Here are two important features of the HD-6 series. First, the new Allis-Chalmers diesel, with follow-through combustion — a sure bet for top performance, long life, low upkeep costs. Second, the exclusive all-steel box-A main frame. It protects

the entire power train from shock loads, makes possible superior over-all balance, better equipment mounting . . . plus the service simplicity of unit construction. Major assemblies like engine and clutches can be easily removed without disturbing adjacent parts.



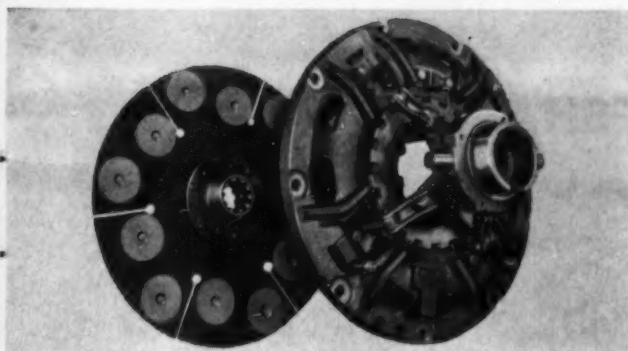
STRADDLE-MOUNTED FINAL DRIVE GEARS

Tapered roller bearings support both ends of the final drive gear shafts. With smaller gears and shorter shafts (plus line-bored, one-piece case), that means better bearing and gear alignment, more strength, longer life . . . even with the big load requirements of today's mounted equipment. And double-reduction final drives provide greater ground clearance.



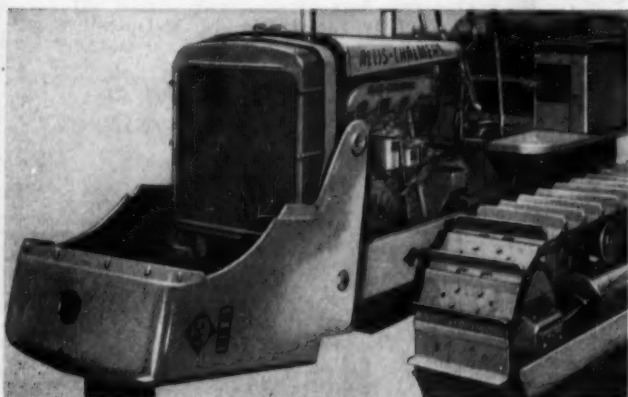
NEW-DESIGN, HEAVY-DUTY TRACK

The best available methods in metallurgy and manufacturing are used to produce HD-6 track that will provide long life under the toughest conditions. In addition to new over-all design, HD-6 sidebars benefit from new heat-treating methods which make possible new standards of strength and hardness throughout for extra wearability.



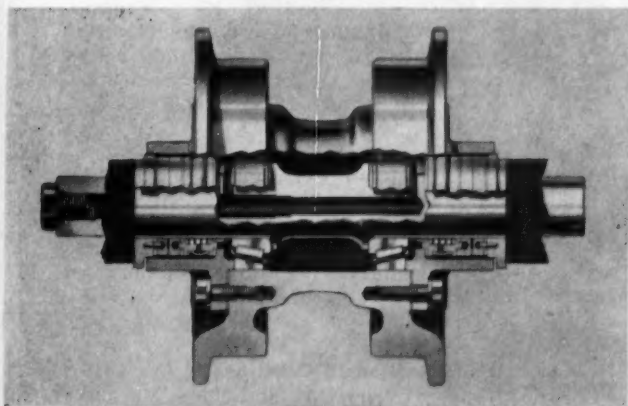
EXTRA CLUTCH LIFE — WITH CERAMIC LINING

— The HD-6 master clutch offers simple, single-plate, overcenter design. Revolutionary new ceramic button clutch lining keeps clutch operating longer between adjustments . . . lengthens clutch life . . . reduces lever pull for easier operation.



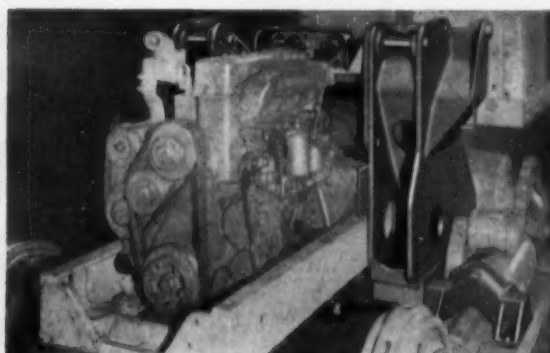
BIG, WELL-PROTECTED RADIATOR

Extra large, one-piece radiator provides all-weather cooling capacity. "Wrap-around" guard enables core to be mounted independently of guard for maximum strength and protection . . . and guard tilts forward for easy service accessibility.



SIMPLIFIED LUBRICATION

Truck wheels, idlers, support rollers need lubrication only once every 1,000 hours . . . because tapered roller bearings let Positive Seals work effectively to keep out dirt and moisture. No lube points under the tractor . . . no lubrication needed more often than every 75 hours. Go from one to two weeks without needing a grease gun.



HD-6G TRACTOR SHOVEL FEATURES

Here's the HD-6G shovel frame mounting assembly. The base of the side frame is mounted in the front to the tractor rigid beam, and at the rear to the truck frame. The upper part is bolted to a heavy steel "stabilizer" forming the cowl of the tractor. Together with the HD-6G's new hydraulic system, it provides greater strength, service simplicity and operator visibility. The HD-6G also offers a new two-position bucket, a two-speed reverse, and has extra long track, with six truck wheels on each side.

FEATURES AVAILABLE ONLY IN HD-6

. . . no other tractor in this size class has them — all-steel main frame; one-piece steering clutch and final drive housing; double reduction final drives; welded steel truck frames; roller bearing truck wheels, idlers and support rollers; extra-heavy truck wheels and guards available; Tru-Dimension tracks; wrap-around radiator guards; engine-mounted bulldozers; heavy-duty Allis-Chalmers diesel engine with "follow-through" combustion; rubber engine mounting pads; ceramic button master clutch lining; unit construction; 1,000-hour lubrication intervals for truck wheels, idlers and support rollers; 24-volt direct electric starting (standard); crankcase guard (standard); bumper and lights (standard).

Write now for more facts . . . or see your nearby Allis-Chalmers dealer

ALLIS-CHALMERS

Construction Machinery Division
Milwaukee 1, Wisconsin

Please rush more information on the new HD-6.

☐ Bulldozer-Drawbar Tractor ☐ Tractor Shovel

Name

Title

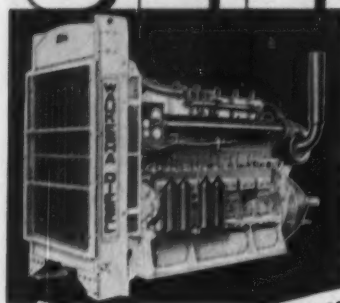
Company

Address

City State CME

ALLIS-CHALMERS

SEE your WAUKESHA DISTRIBUTOR



Engines and Power Units UP TO 1135 HP

- NORMAL AND TURBOCHARGED DIESELS
- GASOLINE • NATURAL AND LP GAS

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WAUKESHA MOTOR COMPANY, Waukesha, Wisconsin • New York • Tulsa • Los Angeles

BIG JOBS OF MONTH...

Continued from page 22

Del., for Delaware Power & Light Co., 600 Market St., Wilmington, Del.

Koppers Co., Inc. Koppers Bldg., Pittsburgh, Pa., 19-oven coke battery and auxiliary equipment at Monessen, Pa. for Pittsburgh Steel Co., Grant Bldg., Pittsburgh, Pa. \$15,000,000.

Guy F. Atkinson Co., 10 W. Orange Ave., S., San Francisco, Calif. and United Construction Co., 64 W. 5th St., Winona, Minn. Greenup Locks, Kentucky, for the U.S. Engineers 237 Fourth Ave., Huntington 18, W. Va. \$14,603,317.

Dwight Lloyd Div. of McDowell Co., Inc., 3203 W. 71st St., Cleveland, Ohio. Cement plant at Lorain, Ohio, for Universal Atlas Cement Co., 101 Park Ave., New York City. \$20,000,000.

R. B. Potashnick Construction Co., Box 423 Cape Girardeau, Mo. Construction of Ferrells Bridge Dam and appurtenances, Cypress Creek Marion Co. Tex., for U. S. Engineers, foot of Prytania St., New Orleans, \$5,758,287.

Foley Bros. Inc., New York Bldg., St. Paul, Minn.; Winston Bros. Construction Co., Northwestern Bank Bldg., Minneapolis, Minn. Donovan Construction Co., 1725 Carroll Ave., St. Paul, Minn., C. F. Lytle Co., 250 Insurance Exchange Bldg., Sioux City, Iowa, and Missouri Valley Construction Co., Leavenworth, Kan. Outlet works, Stage IV, control substructures, Oahe Reservoir project near Pierre, S.D. for U. S. Engineers, 1709 Jackson St., Omaha, Neb. \$4,-631,805.

Massman Construction Co., 1221 Baltimore St., Kansas City, Mo. Construction of lock and appurtenances for Warrior Lock and Dam, Alabama, for U.S. Engineers, P.O. Box 1169, Mobile 7, Ala. \$5,-296,393.

MacDonald Construction Co., 1310 S. Grand Ave., St. Louis 4, Mo. and Foster & Creighton Co., American National Bank Bldg., Nashville, Tenn. Contract No. 7, airframe overhaul base for Mid-Continental International Airport, Kansas City, Mo. for City, City Hall Kansas City. \$8,179,291.

THE NEW **THEW LORAIN**

MODEL **DIXIE**

A NEW $\frac{3}{8}$ -YD. MODEL MADE, SOLD, SERVICED BY THEW-LORAIN

The acquisition of the $\frac{3}{8}$ -yd. "Dixie" model adds another go-getter to the Thew-Lorain line of products. Now manufactured by Thew, the "Lorain-Dixie" is competitively low-priced; doesn't have to back down on any comparison of quality. This proved $\frac{3}{8}$ -yd. machine now proudly carries the "Lorain" nameplate . . . is backed by all the handy parts stocks and service know-how of Thew-Lorain's entire nation-wide distributor organization. Get the facts today, because you'll be surprised at how much sheer quality and money-making performance you can get for so little money.

*Factory or Field
Rubber-tire
Mountings*

*All horizontal
Power Shafts on
Anti-friction
Bearings*

*Squatty, Low
Center of
Gravity—
High
Stability*

*Hydraulic
Controls*

*4 sets of Top and
Adjustable Bottom Hook Rollers*

*5 interchangeable
Hydraulic Clutches*



Shovel



Crane



Hoe

THE THEW SHOVEL CO., LORAIN, OHIO, U. S. A.

MANUFACTURED BY

THEW LORAIN

Now! A Coil Built for

Now Delco-Remy Model 1115400 Ignition
Coil for Cold Weather Applications



A GENERAL MOTORS PRODUCT



A UNITED MOTORS LINE

DISTRIBUTED BY WHOLESALERS EVERYWHERE

Sub-Zero Weather

NEW DELCO-REMY MODEL 1115400

IGNITION COIL ANSWERS "BLUED POINT" PROBLEM

IN 6-VOLT AUTOMOTIVE ELECTRICAL SYSTEMS

Here's the engineered answer to winter starting troubles resulting from burned distributor contact points in 6-volt systems—the new Delco-Remy Model 1115400 ignition coil. This special-duty unit solves the problem at the source by protecting the contact points from excessive primary currents which cause destructive oxidation. With a Model 1115400 coil on the job, contact points continue to operate at summertime efficiency even in sub-zero weather, thus assuring easier starting, better ignition, longer point life.

Here's more good news! A Model 1115400 ignition coil will also keep contact points working more efficiently at all temperatures in "problem" installations such as taxicabs, door-to-door delivery trucks, and other vehicles customarily operated at low speeds and subject to excessive engine idling. The reason is the same—prevention of excessive primary current means less point deterioration.

The new Model 1115400 is the latest addition to the famous Delco-Remy line of oil-filled service coils—has all of the "eight ways better" features, too! The complete line is available everywhere through United Motors distributors.



Delco-Remy
ELECTRICAL SYSTEMS

DELCO-REMY • DIVISION OF GENERAL MOTORS • ANDERSON, INDIANA



THE NEW D7, D8 and D9

here's what they can mean on your job

The new 286-HP CAT* D9 Tractor

Choice of torque converter or oil clutch drive. First track-type tractor with Turbocharger. Completely new 286-HP engine. "Live-shaft" drive for rear-mounted equipment. Many other important features.

The new 191-HP D8

With torque converter (Series D). With exclusive oil clutch drive (Series E). Completely new 191-HP engine. "Live-shaft" drive for rear-mounted equipment independent of fly-wheel clutch. New easy-working controls. Many other improvements.

The new 128-HP D7 Series C

Gear-type balancer gives six-cylinder smoothness. New 128-HP engine. Drawbar pull now 28,700 lb. maximum. New starting engine for simpler, easier operation. Track shoes hardened by "water quench" process. And many other important advances.

The year's biggest news on tracks: Caterpillar's three great new Diesel Tractors.

They're big news because they give you greater power and better performance than ever before.

The D9 and D8, for example, give you your choice of torque converter or exclusive oil clutch drive so you can best match your machine to your own job requirements.

All three give you features like one-piece frame-steering clutch case assemblies, and track shoes specially hardened by a new "water quench" process which means longer shoe life.

All three are easier to operate, with simpler, more powerful starting engines, easier working controls and other improvements.

They're easier to service, too; an exclusive trouble-free oil clutch, separately removable power train components and a fuel system that needs no adjustments in the field are only three of many reasons why.

Better be sure you get *all* the news about the new D7, D8 and D9. Call your Caterpillar Dealer today. Or mail the coupon below.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

MAIL TODAY!

CATERPILLAR TRACTOR CO., Peoria, Illinois, U. S. A.

I'd like all the big news about the new D7, D8 and D9.

Name _____

Company _____

Address _____

City _____

Zone _____ State _____

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

**THE NEW D9, D8 AND D7
—EXAMPLES OF CATERPILLAR
LEADERSHIP IN ACTION**



YOUR WICKWIRE ROPE DISTRIBUTOR SAVES YOU DOWN TIME

When the lack of the proper wire rope halts your production or your operations, thank your lucky stars that your helpful Wickwire distributor is only a quick phone call away. It's a wonderful feeling...to know you'll be getting exactly what you need from his warehouse stocks in only a few hours time.

Now contrast that with the cost in time, money and inconvenience of emergency shipments direct from a distant manufacturer.

In addition to saving on down time, your Wickwire distributor effects further economies by recommending the wire rope that will give you the longest service life, by minimizing your bookkeeping, inventory maintenance and transportation costs. He keeps your reserve stocks for you so that you don't tie up capital in stand-by materials, warehouse space and unnecessary stock insurance and handling.

Your Wickwire Rope distributor is a good man to know. He's quality people handling quality products. Buy your wire rope and slings from him. You'll find that the many valuable services he offers far outweigh any apparent price advantage you might gain by buying direct.



A PRODUCT OF THE COLORADO FUEL AND IRON CORPORATION

NO SINGLE WELDER WILL DO IT ALL!

THERE'S EXACTLY
THE RIGHT **miller** WELDER
TO MEET EVERY WELDING REQUIREMENT

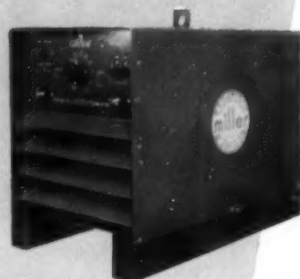
MILLER SR RECTIFIER TYPE DC ARC WELDERS

Available in 200, 300, 400 and 600 amperes, it is a superior direct current welder using Miller Unitron transformer control and selenium rectifiers for conversion from 3 phase AC line current. Miller SR Welders feature widest possible current range, extreme arc flexibility, maximum electrode deposition rate and highest electrical efficiency.



THE *New* MILLER SRH RECTIFIER TYPE DC ARC WELDER

A new concept in welder design for all DC metallic arc welding. Available in 200, 300 and 400 amperes. It is ruggedly constructed, compact, and is designed to lend itself to stacking for parallel operation or to conserve floor space. It has single range control and is weatherproof.



MILLER ARC WELDERS FOR TUNGSTEN ARC WELDING PROCESS

These Miller Welders feature the patented Miller UNITRAN control circuit which combines the transformer with its own integral flux diverter. This, in conjunction with adequate open circuit voltage, high frequency, balancing resistor and optional controls insures superior uniformity and flexibility throughout the entire welding range. Available in nine models.



THE *New* MILLER **MULTI-ARC** COMBINATION AC-DC WELDER

Available in 14 models, this new Miller Welder provides both AC and DC welding power for applications where both are required. It operates from a single phase power line and is available with high frequency and controls designed especially for inert gas arc and spot welding.



miller

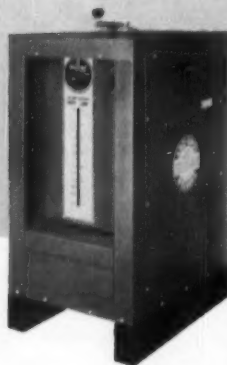
ELECTRIC MANUFACTURING CO., INC.

P.O. Box 798 Appleton, Wisconsin

Write today for complete information
on these Miller Welders.

MILLER 100 SERIES HEAVY DUTY INDUSTRIAL TYPE AC WELDERS

Designed for heavy production welding and automatic welding applications. Available in eight models. The 100 Series Welders permit faster welding—as much as 35% faster. Movable coil design and 80 volts O.C.V. produces uniform and better welding characteristics throughout the entire range of the welder.



"... if it's MILLER you know it's the finest..."



Morrison-Knudsen, *and electric* Blythe Brothers, *Tournapulls*

... the trio which is licking
one of the toughest jobs
in airport-building history

Excellent production with their fleet of electric Tournapulls is being reported by Morrison-Knudsen Company, Inc. of Boise, Idaho, and Blythe Brothers Company of Charlotte, North Carolina, joint-venturers on dirtmoving work for the new Air Reserve Training Center at Alvin Callender Field, Belle Chasse (New Orleans), Louisiana.

Moving Mississippi River-bed sand from stockpile to swamp fill, each of the combine's 4 high-speed "C's" completes a typical 12,000 ft. cycle every 9 minutes 25 seconds. Of this, load time averages 55 seconds; spread, 20 seconds. Load size, with 148 hp pusher aid, averages 13 pay yards ... the 5900' haul over well-maintained sandy roads averages 15.7 mph ... the 5900' return, 17.2 mph. These figures, the result of accurate time-studies made by field engineers, add up to 6 loads (78 pay yards) per Tournapull per 55-minute hour. Contractors' load count on this length haul show a similar per-machine

average of 5 to 6 loads per hour for the entire construction period.

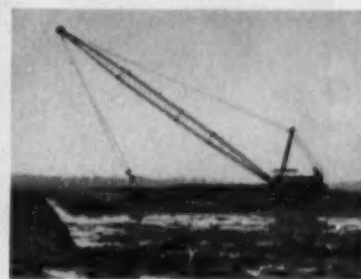
Rigs pull through soft footing

Morrison-Knudsen and Blythe Bros. officials cite "high speed" and "ability to keep traveling through soft fills" as two major advantages of their electric-control Tournapulls. The reason for Tournapulls' ability to work in soft underfoot conditions is simple. Of all scrapers, only Tournapulls have an automatic power-transfer differential *and* power steer. The differential prevents a drive wheel, which loses traction, from spinning and digging in. The power steer works through geared kingpin independent of footing, lets you pivot prime-mover from side to side to move drive wheels out of ruts.

If you have a tough job on hand or coming up this season, let us show you how an electric-control Tournapull can help lick it. We'll be glad to demonstrate on your job. There's a size to fit your needs ... the 7-yard "D" ... the 16-yd. "C" ... and the NEW 23-YD. BIG "B".*

*Capacities heaped without sideboards. Factory-built sideboards available to increase capacity for use in light materials.

A mammoth cypress swamp of the Mississippi Delta is the scene of this sand-muck-water air-base job — one of the most difficult contracts in either Morrison-Knudsen or Blythe's long history. "Nothing can work here," many experts said. "The footing is too poor — 7 ft. of bog on top of 100 to 200 ft. of unstable material."



But Morrison-Knudsen and Blythe have rapidly proved the experts wrong. First they put a big dragline on mats, and with it stripped and side-cast all muck and vegetation. Depth of stripping varied from 1 to 7 ft. over the entire 200' x 8,000' runway, 2000' runover strip, taxiway and apron areas. At another location, over a million yards of Mississippi River-bottom sand were dredged and pumped into a giant stockpile. This job, now completed, provided material for sub-base plus an 8' surcharge. The surcharge, which will help speed settling of the sub-base, will weigh 50 to 100% *more* than the future load of pavement. It will be left on a section of sub-base 30 to 45 days, then moved forward to the next section. Six moves are planned, each move to involve handling about 75,000 yards. Photos and time study on this page were made when Tournapulls were hauling sub-base. Later, the 4 "C's" will handle and re-handle the surcharge.



Government soil experts say the sand here, dredged from river-bottom, is either marine in origin (from the ancient past when the Delta was part of the Gulf of Mexico) or glacial (washed down the Mississippi). In either case, it's probably the same hard-loading, abrasive type of sand that wrecks crawlers in your state.

Tournapull—Trademark Reg. U.S. Pat. Off. P-905-A-b

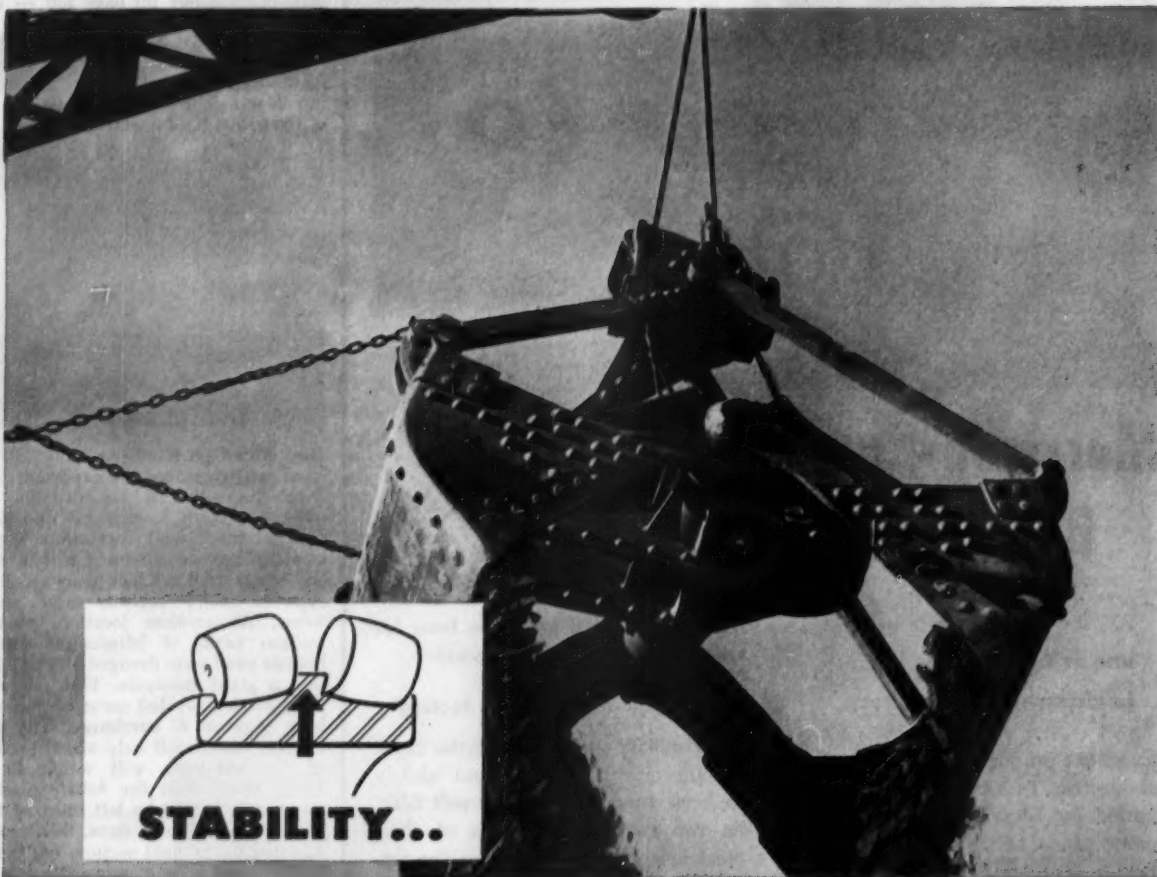


LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

IN THE CRUSHED STONE INDUSTRY, TORRINGTON BEARINGS are used in many applications, including crushers, screens, shovels, cranes, pulverizers, grinding mills and rotary kilns.



TORRINGTON Spherical Roller Bearings

*are designed with integral center flange
on inner race to provide positive radial stability
and positioning for thrust loads*

This center flange guides the rollers accurately and friction is reduced to a minimum.

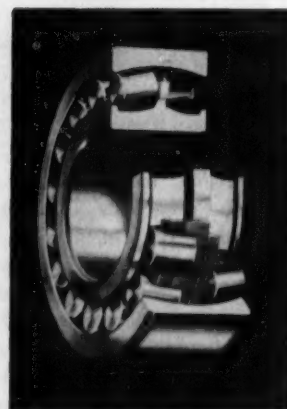
Other performance-building features include accurate geometrical conformity between races and rollers to provide ultimate load carrying capacity; carefully heat-treated races and rollers for maximum resistance to shock and wear; one-piece machined bronze cage for each path of rollers to allow thorough lubrication and give freedom of operation.

These are some of the reasons why TORRINGTON SPHERICAL ROLLER BEARINGS give long, satisfactory performance.

TORRINGTON SPHERICAL ROLLER BEARINGS are available from stock with either straight or tapered bore, for shaft or adapter mounting.

Specify TORRINGTON and get these operational advantages in your equipment.

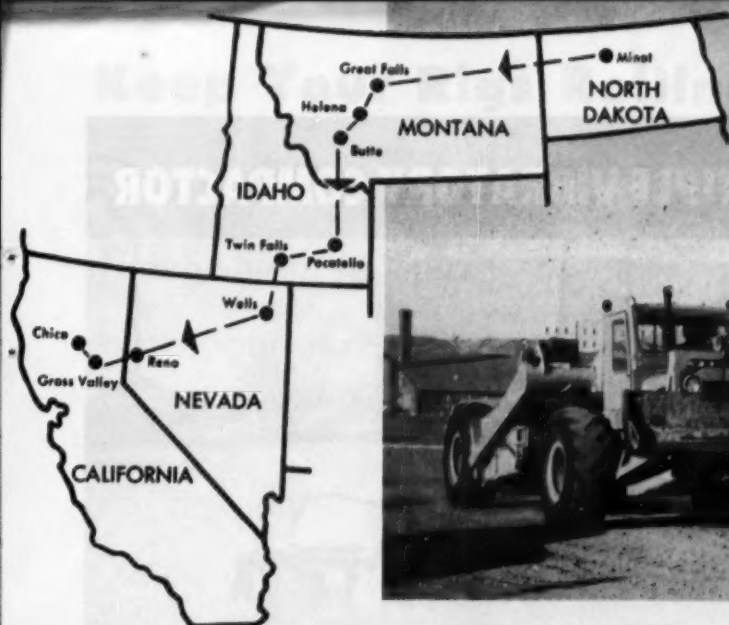
THE TORRINGTON COMPANY
South Bend 21, Ind. • Torrington, Conn.



*District Offices and Distributors in Principal Cities
of United States and Canada*

TORRINGTON SPHERICAL ROLLER BEARINGS

Spherical Roller • Tapered Roller • Cylindrical Roller • Needle • Ball • Needle Rollers



Drives 1,750 miles . . .

total cost **\$170**
total saving **\$800**

What would you do if your dirt-moving equipment was in North Dakota and you had the chance to work in California?

If you had crawlers and scrapers, or big self-propelled scrapers, you'd probably ship them by rail. It would cost you at least \$870 per unit one-way, and the trip would take a week or 10 days. Expensive? Yes, but about the only method you could use.

Vernon Testerman, Minot (North Dakota) contractor, had another solution to the problem. His 7-yard D Tournapull, he figured, could easily make the trip under its own power. After all, he had driven the "D" all over North Dakota. The unit's low-pressure tires did no damage to pavement. It was narrow enough and light enough to go anywhere. And it could travel most of the way at 28 mph.

Remembering these advantages, Contractor Testerman checked his machine, loaded fuel drums and

other supplies in the scraper bowl, filled up the tank and started off.

Travels 80 hours, averages 22 mph

First check-point for contractor and machine was Great Falls, Montana. From here, the "D" traveled to Helena and Butte, Montana . . . then through Pocatello and Twin Falls, Idaho . . . Wells and Reno, Nevada . . . and Grass Valley, Calif.

On the 8th day, Tournapull arrived in Chico, California. It had traveled 1,750 miles. Total running time, as clocked by the hour-meter, was 80 hours.

"Cost of the trip," writes Testerman, "was exactly \$170. That includes fuel, oil, meals, hotel, even cigarettes for the driver, Garry Dibble of Stanley, N.D. It also includes the price of a new water pump. I also had to buy a license in Montana, which cost \$11; otherwise I wasn't stopped or asked any questions except by curious people who said I was crazy. They will really

think so when I meet them on the road back home to North Dakota."

Or maybe they won't think so, when they realize Testerman saved \$700 on the one-way freight bill alone. Or that he also saved about \$100 for air or rail transportation for his operator. Plus 1 or 2 days in time. Plus a lot of trouble loading, unloading, etc.

Finishes jobs before others arrive

Chances are, you may never have to make a thousand or two-thousand mile trip with your dirtmoving equipment. However, Tournapull's work-and-run ability cuts non-productive time to a minimum on any length move. With Tournapulls, you take the shortest route between jobs, over main highways and through cities, to make the most economical use of manpower and equipment. As Mr. Testerman puts it, "With D Tournapull, you can travel to a small job and have it finished before another type of machine could be loaded and moved. The money you once paid for hauling can be put in your pocket."

Ask us for a demonstration of the LeTourneau-Westinghouse D Tournapull so you can check its mobility and other advantages for yourself. Call to arrange time and place.

Tournapull—Trademark Reg. U.S. Pat. Off. DP-647-G-b

LeTourneau-Westinghouse Company

PEORIA  ILLINOIS

A Subsidiary of Westinghouse Air Brake Company
(Advertisement)

On the job, "D" Tournapull usually self-loads. Here it heaps 5 pay yds. of sandy loam in 1 min. Typical 900' cycles take 2½ minutes.

Tires provide such good compaction, rollers often are not needed. Nor are small tractor-dozers; "D's" blade does much of their work.



The **JACKSON** MULTIPLE VIBRATORY COMPACTOR



Used on the VAST MAJORITY of
IMPORTANT ROAD-BUILDING JOBS!

On all of the new toll roads and on dozens of other highway and airport building projects JACKSON MULTIPLE COMPACTORS are the predominant medium for consolidating the granular soil sub-bases and the base courses of sand, gravel, rock or slag in waterbound and penetration macadam construction. They're also very extensively and successfully used on large area fills of various other types.

The popularity of this equipment has grown by leaps and bounds as one contractor after another discovered that with it specified densities can be achieved with greater uniformity, more economically and in less than one-half the time required with equipment of other types. Moreover, the Jackson Multiple will get into places larger equipment cannot reach, and for the really tight spots, individual compacting units may be detached, fitted with operating handles and operated like a standard, self-propelled manually guided compactor.

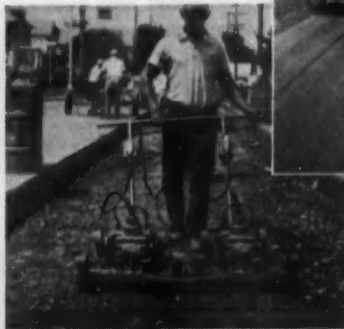
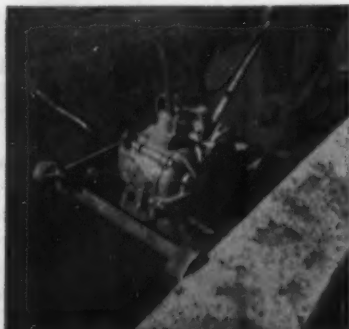
If you have any job requiring granular soil compaction, it will pay you to know specifically what Jackson Vibratory Compactors will do. See them at your nearby Jackson Distributor. Literature and Distributor's name on request.

Jackson manually-guided, self-propelled vibratory compactors deliver 4200 2-TON blows per minute. Achieve specified density of granular soils in layers as thick as 10" at the rate of 1800 sq. ft. per hr.

One man can readily operate a twin hook-up of Jackson Compactors, thereby virtually doubling production. Current is usually supplied by power plant on auto trailer (single or twin unit) with hydraulic pick-up of Compactor.



As indicated by the adjacent photos, the JACKSON MULTIPLE is readily adaptable to widening projects of any width.



JACKSON
VIBRATORS, Inc.
LUDINGTON, MICHIGAN

Keep Your Rigs Rolling in Cold Weather

Timely hints to help keep your earthmoving equipment on the job during winter months



Don't let snow and ice "freeze" your profits! You can keep on moving dirt well into winter if you follow the simple cold weather procedures outlined below.

Your profits depend upon continuous operation all seasons. These tips to your operators and maintenance men will pay big dividends if followed carefully.

Add Anti-Freeze

Drain and thoroughly flush the cooling system. Carefully check radiator, hose, gaskets, and connections for possible leaks. Be sure all connections are tight. Repair or replace if necessary.

Fill cooling system with a good grade of anti-freeze—preferably a permanent, ethylene glycol solution, with a boiling point higher than 180° F. Test the solution at the end of each day to make sure it is strong enough for protection against prevailing temperatures. A few gallons of anti-freeze are much cheaper than a broken engine block or radiator.

Use Winter Oils and Fuel

Drain summer-weight oils from engine crankcase, transmission and final drive. Use a good flushing oil to remove sediment and sludge. Refill with winter-weight oils and greases, recommended in equipment manuals.

Summer fuel may be a little heavy for use in winter operation, so be sure the pour point is low enough to permit it to flow freely through fuel lines and carburetor at low temperatures. Your fuel dealer can advise you on the proper grade. Be sure to keep fuel clean at all times and in winter be doubly sure to keep water, ice, and snow out of fuel and tank. Strain dirty fuel.

Keep Batteries Well Charged

A low-charged battery will not turn the engine over for proper starting. Also, it will freeze more easily than a properly charged battery. If batteries are nearing the end of their effective use, it may be advisable to replace them before winter starts. Check charge more frequently in winter, recharge or replace to maintain a higher standard than in summer.

Check water level often. Add necessary water during working periods so that water will mix thoroughly with battery electrolyte. Do not add water while machine is idle. It may freeze and ruin the battery.

Warm Up Period

Warm engine to operating temperature by idling at half-throttle for a few minutes to insure thorough circulation of oil. If engine does not heat properly, check cooling system thermostat.

If Diesel engines become hard to start in extremely cold weather, pre-heat the air taken into the cylinders. Some engines are equipped with pre-heating devices. On other engines, careful use of blow torch usually does the trick.

Working With Frozen Ground

Break up hard, frozen top soil with a Rooter or Dozer. Scrapers can then load without interruption. When using a Dozer for this purpose, dig in with one point of the blade until the frozen soil is broken through. Then work the blade under the frozen surface and lift it out in large chunks.

If load-carrying capacity of the tires will permit, reduce air pressures slightly when operating on rough, frozen ground. This will cushion shocks of running over frozen chunks, lengthening tire life. However, avoid striking sharp chunks of frozen earth with the tires.

End of the Day

Remove all dirt from scraper bowls and dozer blades before parking machine for the night. To keep dirt from freezing onto scraper bowl or dozer blade, spray after cleaning with a thin film of drain oil. When parking overnight or for any length of time, lower the scraper or dozer bowl onto planks to prevent bottom edge from freezing to the ground.

When machine is shut down, cover the exhaust pipe with a tin can or a similar object to keep rain or snow from entering. Open pet cocks on air-reservoir tanks to drain accumulated moisture when you shut down. Be sure to close cocks and build up air pressure before attempting to operate machine next morning.

When earthmoving machines are to be stored in the open and left idle for any length of time, always drain water from the radiator unless you are sure it is properly protected with anti-freeze. Also remove cylinder-block drain-plugs.

For free copies of this article, write LeTourneau-Westinghouse Company, Peoria, Ill., stating quantity desired.

G-745-OP-lw



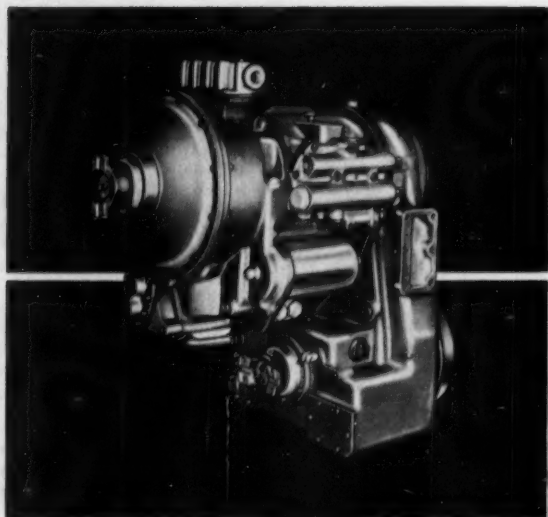
LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

NOW TORQMATIC DRIVE for Shovel-Loaders

- ★ *One Compact Unit*
- ★ *Speeds Job-Cycle Time*
- ★ *Cuts Maintenance Cost*
- ★ *Reduces Driver Fatigue*



SHOVEL-LOADER manufacturers called on Allison's vast TORQMATIC experience to develop a completely modern converter-transmission team for both 2- and 4-wheel-drive models—and here it is!

It's a TORQMATIC Converter, Transmission and transfer gear drop box combined in one rugged, compact, completely self-contained unit that transmits power from 70- to 130-hp gasoline or Diesel engines.

Today six loader manufacturers are specifying this TORQMATIC DRIVE in their newest, most advanced loaders—and with good reason.

Easier to operate—because, with this new TORQMATIC DRIVE, drivers have no clutch pedal to push — about half the work in operating a shovel-loader is eliminated.

Faster working—drivers quick-shift on the go without slowing down. And the TORQMATIC DRIVE also broadens the engine's useful horsepower range for faster, more efficient digging and hauling.

Repair bill savings—eliminates shock-load damage to engine and drive-train components. Fewer engine overhauls because engine lugging and stalling is ended.

If you'd build or buy a better loader, be modern — be sure it's TORQMATIC-equipped.

This new TORQMATIC DRIVE is now available in many models of shovel-loaders — both gasoline- and Diesel-powered — and will soon be offered in a wide range of other equipment made by leading manufacturers.



For more information on this great new TORQMATIC DRIVE, fill out the coupon and mail it today.

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TORQMATIC DRIVES



Allison Division of General Motors
Box 894T, Indianapolis 6, Indiana

Please send me complete information on the new Allison TORQMATIC Converter-Transmission unit.

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Position

Address

I am interested in this TORQMATIC Converter-Transmission unit for
(type of equipment)

**PICTURE
OF THE
MONTH**
CONSTRUCTION
METHODS AND EQUIPMENT



Heads Up!

PILE MONKEY waits to thread interlocks of Foster MP-116 sheetpiling for cofferdam wall at Texas power-plant intake. For comfort, he has fashioned himself a seat from Western-type saddle parts, including stirrups. And for safety, the seat is fitted with a sling so a crane can easily transfer him between ground and pile top.

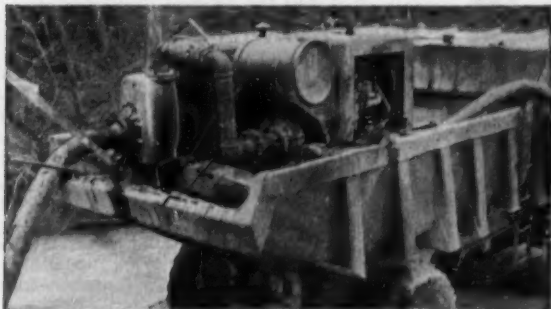
Cofferdam itself is double-walled affair 45x103 ft inside and 60x110 outside. Ultimately it will be incorporated into permanent structure by pouring concrete between walls, then pulling outer line of piling. Brown & Root Inc., Houston, is building 40,000-kw \$5,500,000 addition to City of Austin Plant No. 2, on banks of Texas' sparkling Colorado River.

(Advertisement)

How to wash your face with Jaeger pumps



TO SCOUR THE FACE OF THE TAILRACE CUT for Virginia Electric and Power Company's power station dam at Roanoke Rapids, N. C., Stone & Webster used this ingenious set-up. Two Jaeger pumps (a self-priming 6P and high pressure 5CPH, connected in tandem) traveled in dump truck. Jets with 15/16" nozzles were handled from platforms on crawler-mounted crane. Moving along the cut, they knocked all loose rock and earth from the face with two powerful streams each shooting 370 gpm at 170 lbs. pressure. This method was also used to scour the rock before pouring wings of the dam.



SURE-PRIME AND HIGH PRESSURE TEAM TOGETHER: Jaeger 6P, which maintained prime automatically, was connected in tandem to a Jaeger 5CPH which boosted water pressure to 170 psi. Pumps were set up in dump truck for easy moving along job.



EMERGENCY FIRE PROTECTION: Stone & Webster set up other Jaeger 5CPH pumps like this for standby protection against fires. Their capacity and pressure exceeds that of standard 500 gallon "pumpers".



GENERAL VIEW OF CONSTRUCTION, Roanoke Rapids Power Station of Virginia Electric and Power Co., built by Stone & Webster Engineering Corp. Eleven Jaeger pumps were used on this job.

For full information on Jaeger dewatering and pressure pumps, see your Jaeger distributor or send for catalog P-4.

THE JAEGER MACHINE COMPANY

800 Dublin Avenue, Columbus 16, Ohio

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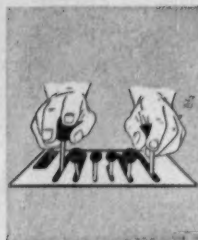
How Link-Belt Speeder engineering helps both the shovel-crane and the operator **increase earning capacity!**



LS-98 with 60' boom and 1 1/4 yard bucket works in sand and gravel pit.

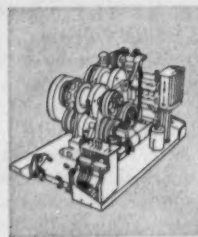
You're ahead on every job — Link-Belt Speeders—whether crawler or rubber-tired—are years ahead of the shovel-crane industry. Only Link-Belt Speeder offers you Speed-o-Matic—the true power hydraulic fingertip control system. Only Link-Belt Speeder offers you so many outstanding design, construction and operator advantages. For facts on every machine in the 1/2 to 3-yd, 10 to 60-ton work range—contact your Link-Belt Speeder distributor or write Link-Belt Speeder Corporation, Cedar Rapids, Iowa.

Two-way speed increase



● Speed-o-Matic, the true power hydraulic control, provides fast, easy, smooth response . . . ideal control for speed with accuracy. It's also engineered to reduce operator fatigue — enables him to maintain greater output with less effort.

Extra power, stamina



● Anti-friction bearings, splined shafts and precision-machined surfaces at every important point convert more rated hp into actual line pull. All-welded, stress-relieved construction permits use of extra power.

More work-time



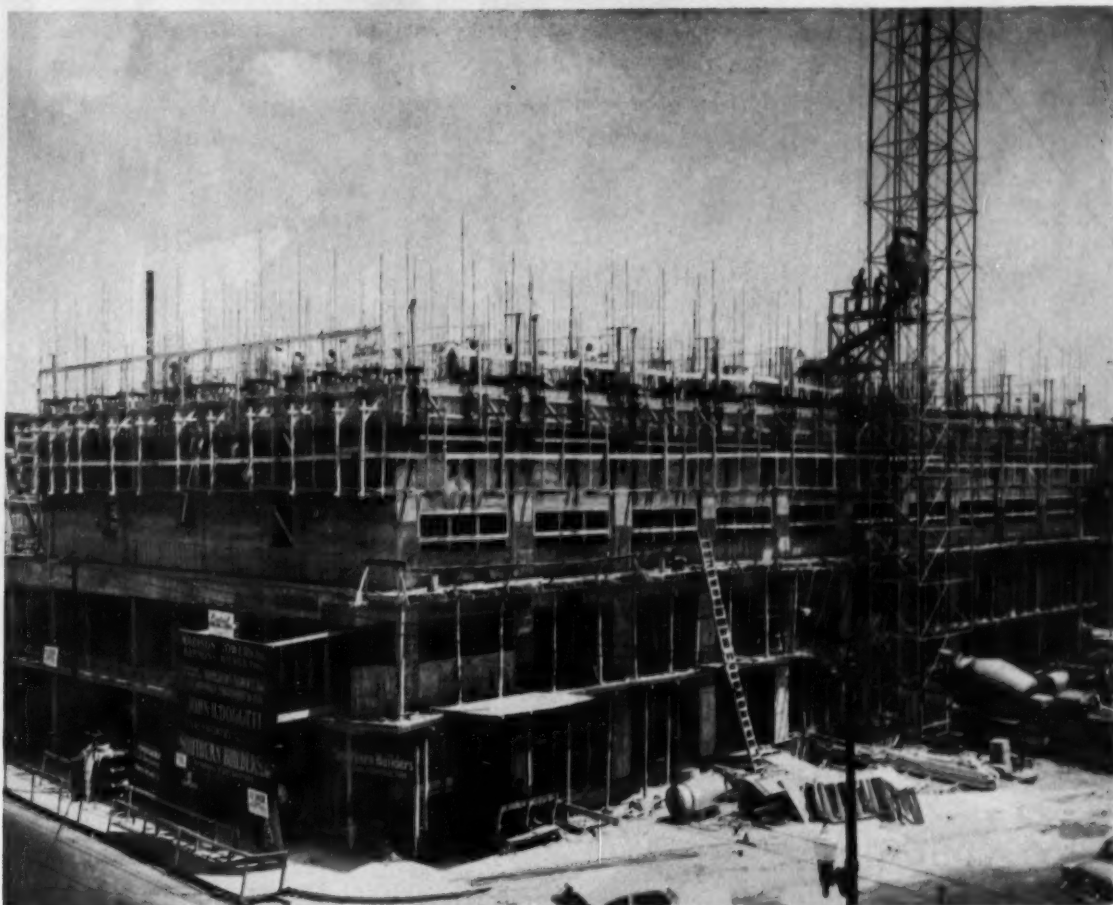
● Speed-o-Matic reduces operator fatigue, losses due to end-of-the-shift let-down. Further, it minimizes downtime. For example, Speed-o-Matic clutch is hydraulic actuated, self-compensating. Eliminates frequent stops for adjustment.

A demonstration can be arranged to suit your convenience. See one of these great machines in action and judge for yourself why they are today's most advanced shovel-cranes.

LINK-BELT SPEEDER

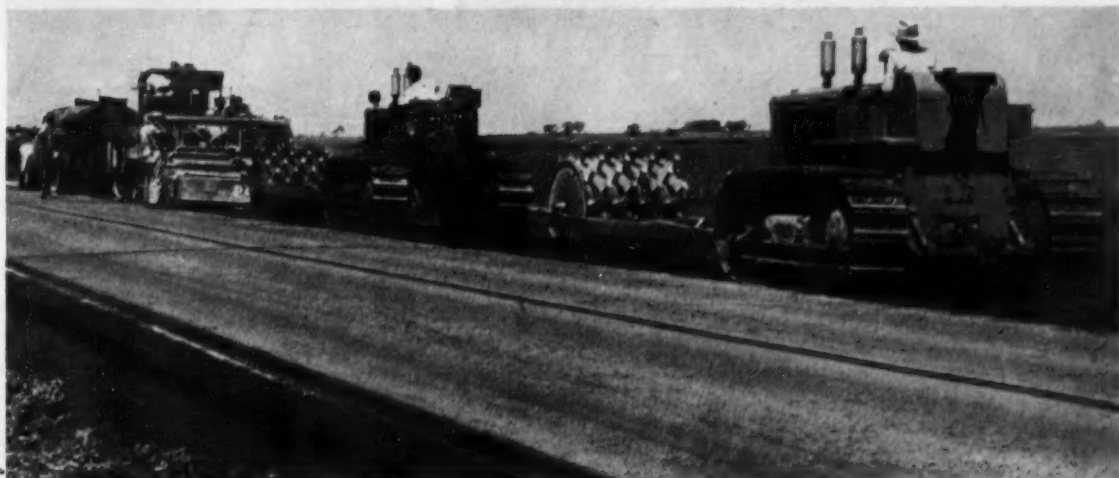
*Builders of a complete line of crawler
and rubber-tired shovel-cranes*

Construction News in Pictures...



EIGHT STORIES IN FIVE DAYS — This apartment building in Memphis, Tenn., goes up at the rate of 9 in. every hour. Concrete is chuted into buggies and placed in slipforms. Meade hydraulic jacks raise the 4-ft high forms. Windows, doors, outlets,

and walls all are poured on the way up. Only the floors remain to be poured. The apartment building is the first slipform building in the United States constructed for habitation. Southern Builders, Inc., is the general contractor.

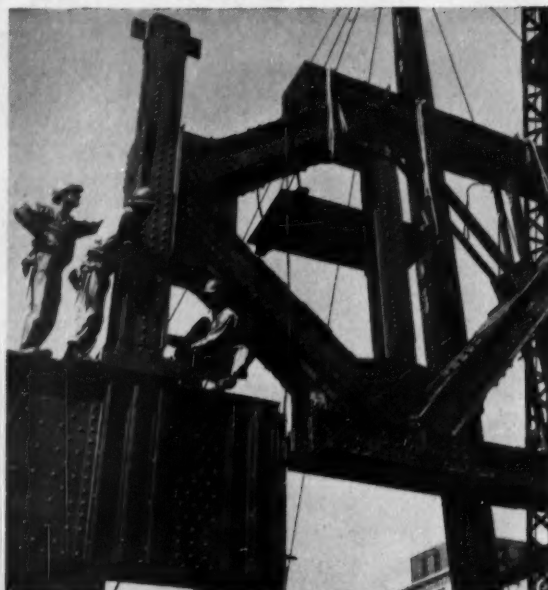


TRACTORS PUSH ROLLERS — Uvalde Construction Co. of Dallas, Tex., uses tractors to push sheepfoot rollers on its job of widening U. S. 277. If tractors had pulled the rollers, the highway's designers feared the tracks of the tractors would cause

the material to bridge over so that the tamping feet of the rollers would fail to get full penetration. By making the first pass with sheepfoot rollers preceding the tractors, it was possible to attain compaction to the full depth. (More photos on next page)



MOVING MUCK—International TD-24 push-loads one of two LeTourneau C Tournapulls used by Miller Excavation Co. for Strategic Air Command's underground, three-story headquarters at Omaha, Neb. Heavy marl averaging 30% moisture was uncovered near bottom of cut. Removing material involves climbs up 10% ramp grades. Robert E. McKee is general contractor.



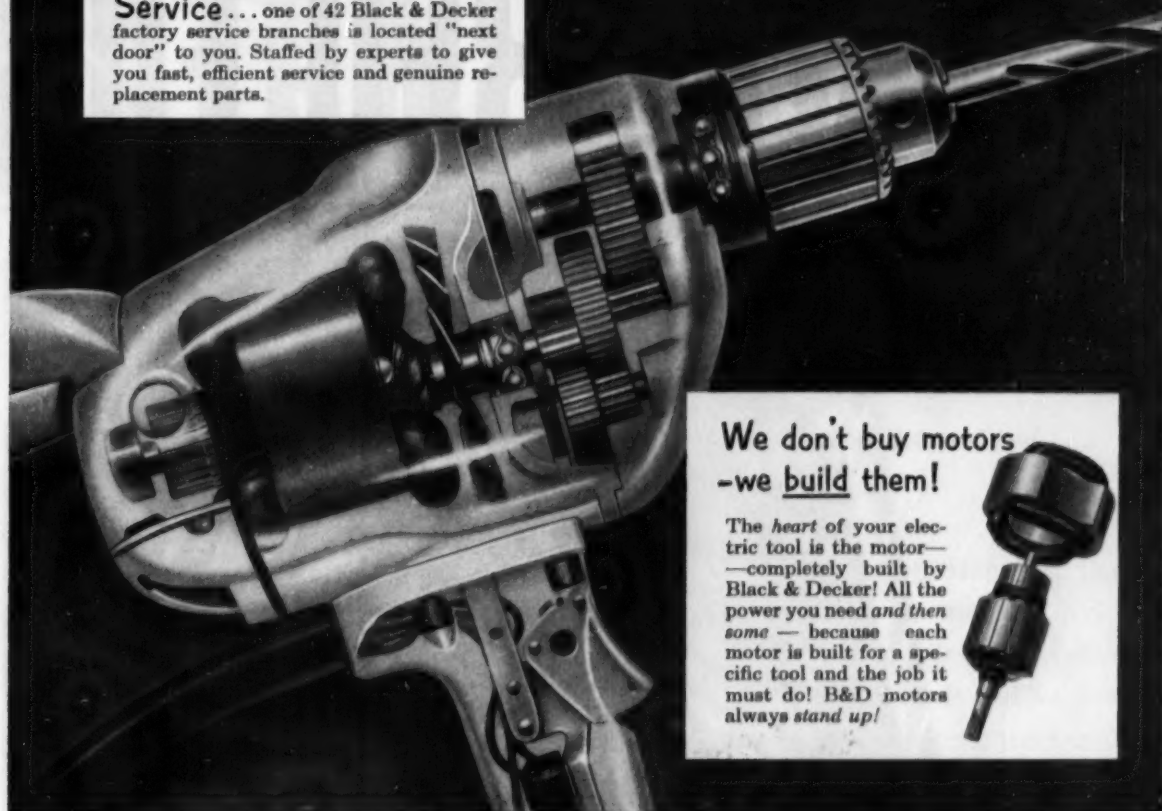
50-TON SUPPORTS—Bethlehem Steel Co. workers erect first of five 16x70-ft steel trusses that will support upper stories and ballroom ceiling of 22-story Philadelphia hotel. Use of high-strength bolts in Philadelphia was authorized for the first time last month. Derrick with 106-ft mast and 95-ft boom positions trusses. McClosky and Co. is the general contractor.



ASSEMBLY-LINE HOUSING—Given a \$4.5 million contract to build 450 homes for Northern British Columbia before winter set in, Johnson-Crooks Construction Ltd. set up circus tents in North Vancouver, hired 500 carpenters, and turned out 50 homes a week on two assembly lines. Pre-cut components are fitted to-

gether like a jig saw puzzle as they roll over 300-ft path of rollers. Homes are then cut in three parts and loaded on waiting barges for the trip up the coast to Kitimat, site of the Aluminum Co. of Canada's big smelting project. There, another crew prepares sites and foundations and puts sections together.

Service... one of 42 Black & Decker factory service branches is located "next door" to you. Staffed by experts to give you fast, efficient service and genuine replacement parts.



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The heart of your electric tool is the motor—completely built by Black & Decker! All the power you need *and then some* — because each motor is built for a specific tool and the job it must do! B&D motors always stand up!

Black & Decker electric drills mean low operating cost—
more convenience, faster work—and they're

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The power, speed and accuracy of Black & Decker Drills mean faster, better production, lower costs! The Black & Decker-originated pistol-grip and trigger-switch, the lightweight, *balanced power*, GUARANTEE reduced operator fatigue! And unexcelled workmanship throughout makes your Black & Decker Drills thoroughly dependable, inexpensive, "low maintenance" construction workhorses. 31

models assure you of the widest selection of drills, from 1/4" to 1 1/4" ... for intermittent or continuous heavy-duty construction or maintenance jobs! No matter what your requirements—you can't beat Black & Decker! For catalog write to: THE BLACK & DECKER MFG. Co., Dept. 2611, Towson 4, Md.

Drills • Saws • Sanders • Grinders •
Hammers • Screwdrivers • Tappers • Glue
Pots • Black & Decker's complete line of
portable electric tools—all POWER-BUILT to
make your jobs faster, better, easier!

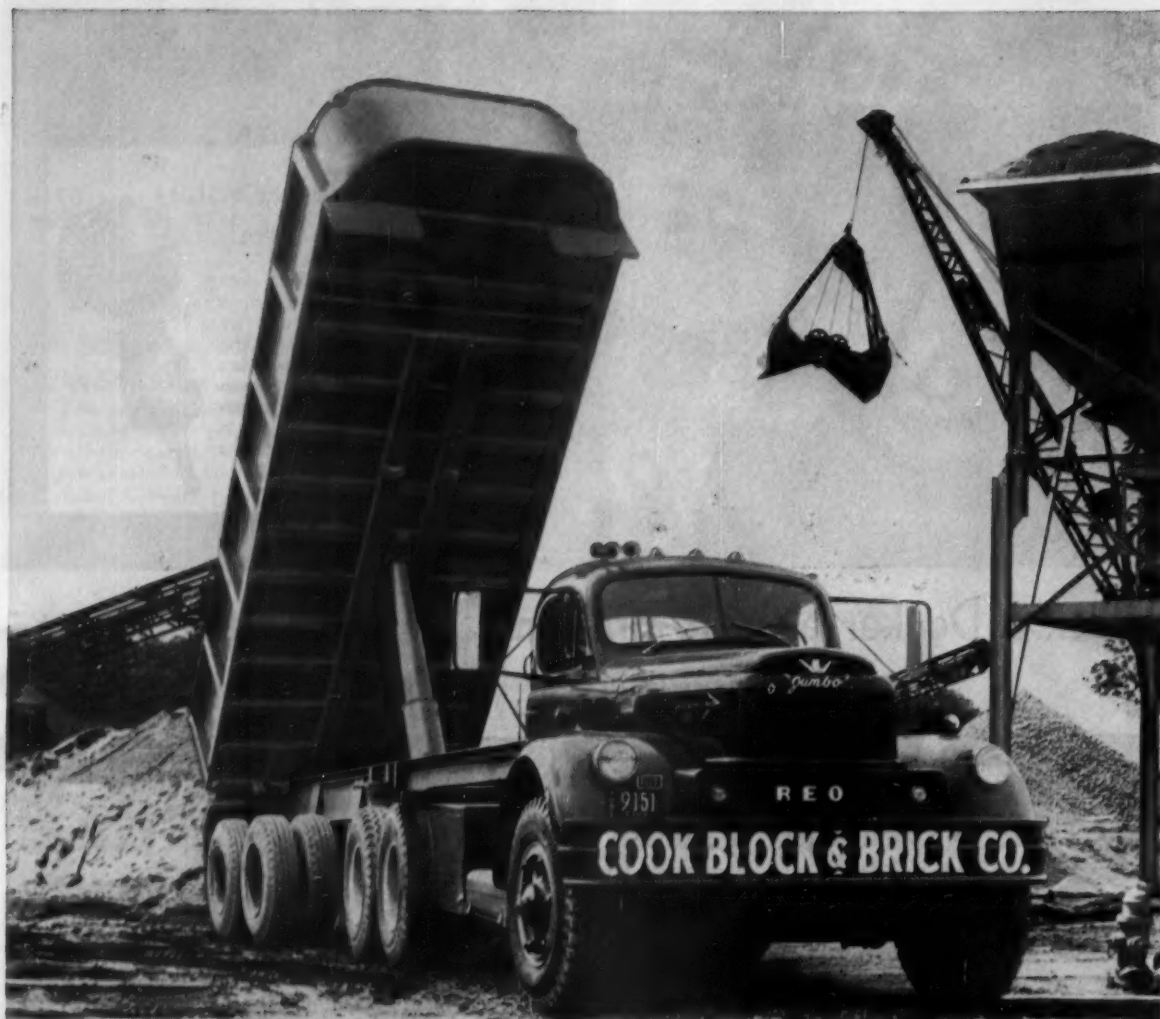
Leading Distributors Everywhere Sell



Black & Decker

PORTABLE ELECTRIC TOOLS

LOOK AT REO FOR



LOOK AT REO IN THE CONSTRUCTION FIELD

Mr. V. E. Cook reports—"We are pulling 72,000 lbs. G.C.W. with Reo's A633-V-8. We were surprised when we weighed the new tractor and found it 2,000 lbs. lighter than other equipment in the 200 H.P. class. Naturally this permits 2,000 lbs. more payload."

EXTRA PAYLOAD

"2000 lbs. MORE PAYLOAD"

... says Virgil E. Cook, President, Cook Block and Brick Co., Anderson, Ind.

An extra ton per trip! Extra payload means extra profit ... that's one of the big advantages you get when you haul with Reos. Reo engineering has eliminated excess weight—built in extra payload. Operators the nation over are experiencing the rewards of Reo's weight-saving design.

On their jobs everywhere Reos are setting spectacular records for power and efficiency. About his Reo wet sleeve, short stroke V-8, Mr. Cook says, *"Our operation is over winding, hilly roads which really test a truck when you*

are pulling a load this size ... (72,000 lbs. G.C.W.)." Reo's powerful 220 h.p. Gold Comet V-8 engines develop a startling 1½ h.p. per cu. in. displacement—up to 35% more efficient than the industry average. Pound for pound, Reo V-8's are the most powerful truck engines on the road.

Reos have the power to move bigger loads faster. They take grades in up to 1½ gears higher than other trucks on the highway and maneuver better in the city.

Reos haul more payload, haul it faster and haul it easier. You'll find it true on your job, too!

100,000 mile or 1 year warranty on all Reo Gold Comet Engines. This is the assurance you get from the manufacturer of the precision construction and outstanding performance that's built into Reo's rugged powerplants. Find out how you get this amazing warranty on the engine in the next truck you buy. Call your Reo Branch or Distributor today.

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SUBSIDIARY OF **BOHN** ALUMINUM AND BRASS CORPORATION

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TRUCKS, BUSES AND GOLD COMET ENGINES FOR ORIGINAL EQUIPMENT, INDUSTRIAL AND REPLACEMENT—GAS OR LPG



Hilton Makes Hotel History



Ingenious Design Cuts Construction Costs on Dallas' 1001-Room Statler-Hilton

● Soon to open in Dallas, Texas, is the luxurious 18-story Statler-Hilton, one of the largest hotels built in 25 years, and latest in the group of 28 hotels welded together by Conrad N. Hilton into the world's greatest hotel organization.

Construction cost of this 1001-room hotel was \$9,350. per room (\$1.54 per cu. ft.), against an \$11,000-per-room average for other new hotels in the system. The reinforced-concrete structural system not only saved money but contributed to the esthetic and functional development of the design.

Of flat-plate construction, the building is T-shaped, with three wings, each about 156 ft. long and 48 ft. wide, radiating from a central core. There are only two longitudinal rows of columns in each wing, with floors cantilevered 10 ft. beyond column centerlines to support the sandwich-panel walls. Floor slabs are 8 in. thick; no drop panels

or column capitals used; only painting was required.

In this latest example of the advantages of reinforced-concrete frame construction, a total of 48,305 bbls. of Lone Star Cement was used. Equally proud is Lone Star of the part its products have played in other famous Hilton Hotels—the Waldorf-Astoria, the Shamrock-Hilton, Houston, and the new Statler-Hilton, Hartford, Conn.

As is so often the case, quality has a way of attracting quality.



THE STATLER-HILTON HOTEL, Dallas, Texas

Owner: HILTON HOTELS CORPORATION

Architect: WILLIAM B. TABLER, New York

Contractor:

ROBERT E. McKEE GENERAL CONTRACTOR, INC.
Dallas, Texas

Structural Engineers:

SEELYE, STEVENSON, VALUE & KNECHT, New York

Mechanical Engineers:

JAROS, BAUM & BOLLES, New York

Haydite Lightweight Block and Aggregate
supplied by: TEXCRETE COMPANY, Dallas



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THE ENTIRE CONSTRUCTION FIELD

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Where Safety Starts

"IS IT ANY MORE IRRESPONSIBLE for management to ask an employee to climb a scaffold which may collapse than to ask that a scaffold be mounted by an employee who may collapse?"

With this provocative question, the controversial subject of pre-placement physical examinations was brought into focus late last month by John A. Volpe in a speech before the Construction Section, National Safety Congress. Volpe, a prominent building contractor and Massachusetts' Commissioner of Public Works, calls the general avoidance of such examinations an area of "no control" that is probably the most serious gap in construction safety today.

Facts would seem to bear him out. Of nearly 28,000 persons taking pre-placement physicals at the DuPont Co., more than 13,000 were found to have some defect of eyes (3%), ears (21%), heart (10%), spine (5%), or hernia (10%). It is probable that similar conditions exist throughout the construction industry. Yet far too few contractors require physical examinations, and far too many workmen and labor leaders resist them.

Benefits to be derived from pre-placement physical examinations are considerable. One study of 3,500 industrial plants showed that such exams decreased accident frequency by 44%, occupational diseases 46%, labor turnover 29%, absenteeism 39%, and compensation insurance costs 30%. While these worth-while savings were not obtained in construction, it is reasonable to suppose that our industry would derive comparable benefits.

Volpe cited one construction company that did institute pre-placement physicals on a two-year dam job. Although the examinations were of very general nature, six serious heart cases were detected in a force of some 400 men. Later checking disclosed that three of the men afflicted had died within eight months of their examinations.

Imagine the possible tragedies had these men been put to work 80 or 90 ft in the air, as the dam job required. Not only would it have been unfair to them, but it also would have been a hazard for

their physically-fit co-workers because construction is largely a team operation. It is this principle of mutual safety on which the concept of the pre-placement physical examination must be founded.

The purpose of the examinations is to help place the worker in accordance with his physical fitness, to assist him in improving his health, and to safeguard the health and safety of his fellow workmen.

The examination must not be allowed to become a performance physical. As Volpe says, "God forbid that possession of these frailties bar a worker from earning a livelihood. Rather let us work together and uncover these conditions, which, more often than not, are unknown to the worker. Let us place these workers on jobs where they can do a full day's work without embarrassment and without any lessening of their stature in the eyes of other workers. Let us fit them into those areas where we, labor and management, can help to insure their individual safety as well as the general safety of the job. No examination can be used as a tool for unjust exclusion from employment or to narrow the field of competition. It should not be a program which might be abused to the point where an employer wants, say, 60 men, examines 100, and takes only the top 60 regardless of the general fitness of the rest."

Therein lies the real fear of those who oppose pre-placement physicals. But certain simple safeguards can be incorporated to make the plan workable and prevent abuse. Among those cited by Volpe are joint selection of physicians by contractor and labor representatives; secrecy of diagnosis, with the doctor maintaining all records and revealing them only with the consent of the employee.

Certainly, pre-placement physical examinations are common enough in other industries. And there are no insurmountable problems that bar more widespread use of them in construction. Institution of such examinations on a rational and honest basis will benefit management and labor alike.



LIMA 6-YD SHOVEL loads Euclid 50-ton truck with only four bucketfuls of rock. Operated by Central Pennsylvania Quarry and Stripping Co., the diesel-powered rig loads about 7,000 cu yd of

rock per 10-hr day. For top production, it usually works in higher face than one shown. Big shovel pays off in cuts of 1,000,000 yd because it seldom has to move and interrupt production.

Big Job Demands BIG Tools

The Job . . . A 70-mi section of Pennsylvania Turnpike's Northeastern Extension through the heart of the Pocono Mountains.

The Tools . . . 6-yard shovels
. . . 50-ton trucks . . . 286-hp dozers
6-in. drills . . . 30-yard scrapers . . .
2-lane paving spreads



SIDE-HILL CUT 150-ft high tests power and maneuverability of big Caterpillar and Euclid scrapers. To reach loading point on top of cut (above) big units must ascend series of hairpin curves with 15% grades. Thick earth mat covers rock cut.

By **ALBERT C. SMITH**
Associate Editor

EVERYTHING about the job is big. From Allentown to Scranton the four-lane superhighway plunges over 70 mi of deep cuts and high fills. Some cuts contain 1,000,000 yd of rock. Others go as deep as 150 ft. Fill heights range up to 90 ft, and extend thousands of feet.

But size is only one problem; the job is on an accelerated construction schedule. To complete it on time, contractors have brought in huge fleets of the biggest and newest equipment. Self-propelled rigs that drill deep blast-holes 6 in. in dia are common. Shovel sizes range from 2½ to 6 yd. Dump trucks carry loads up to 50 tons, and powerful new dozers crawl up hills that tractors never challenged before. Even paving spreads do things in a big way. Teams of dual-drum pavers pour two lanes at once, with the longitudinal joint placed from behind the spread.

Near Scranton, the construction problem is unique. Honeycombs of abandoned coal mines under the Turnpike right-of-way must be filled up to prevent any settlement. The solution—drill thousands of holes down into the mines, sink pipe casings, and slush sand into the voids. It takes big rotary drills and casing machines.

Despite the problems, the job is right on schedule. About a dozen contractors are pushing the work from dawn to dusk and often longer. Their operations are directed by Harry Lundy, division engineer of the Pennsylvania Turnpike Commission. (See details on following pages)

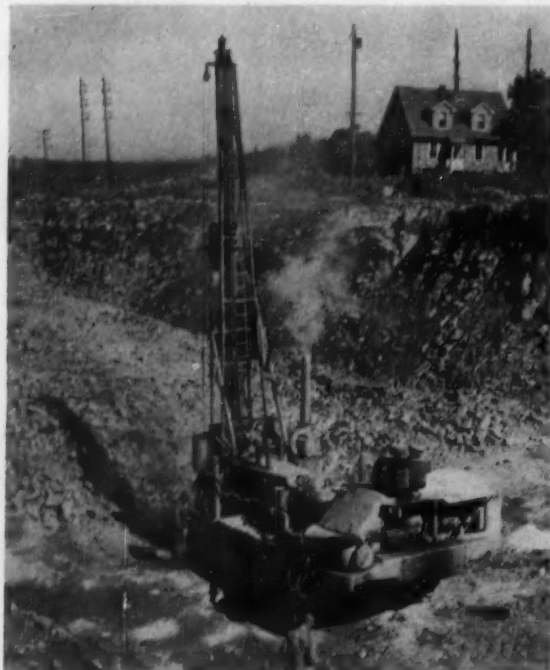


BIG LOAD OF SHALE is easily dozed out of ramp by powerful new Caterpillar D9 tractor. Big 286-hp engine plus heavy weight make rig ideal for push-loading and climbing steep banks. Wide tracks and high frame are well suited for river cleaning.

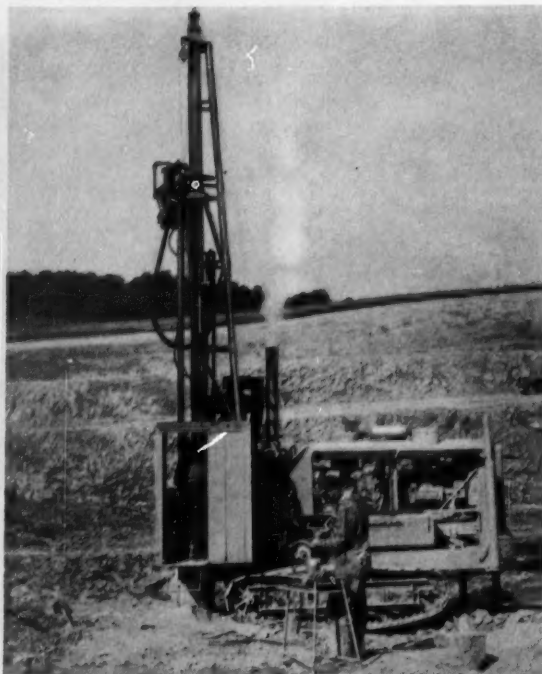


EXTRA SIDEBORDS mounted on big Euclid scraper add 5 yd to capacity. Contractor, Badgett Mine Stripping and Construction Co., gets nearly 30 yd on scrapers without any excess wear on parts. Rock in background is wall of old quarry alongside Turnpike.

Big Job Demands Big Tools... Continued



TRACTOR-MOUNTED Drillmaster made by Ingersoll-Rand handles big cut by itself. It drills 21 ft per hr of 6-in. hole through abrasive white sandstone. Holes are drilled 16 ft deep and 16 ft apart in each direction. In abrasive stone, bits are sharpened every 75 ft. Grinding tool is powered from rig. HD20 tractor, mounts compressor on back.



SELF-CONTAINED Drillmaster is made as a package unit. Compressor powers entire rig, including tracks, dust collector, and hydraulic system. In this cut, holes are drilled 50 ft deep and 16 ft apart. Rig drills 375 ft of 6-in. hole in 12 hr through slate. Eight-days' drilling produces 25,000-yd shot. Shovels excavate in two lifts.

Large-Hole Drills Cut Blasting Costs

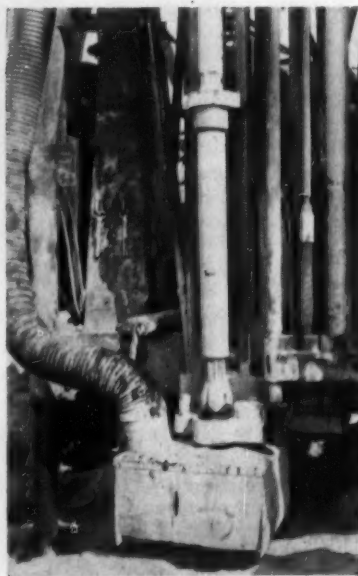
- Self-contained units that drill 6-in. blast holes up to 60 ft deep rapidly are replacing wagon drills on big rock cuts. They are faster, cheaper, and more efficient. In fact, one large-hole drill with a 2-man crew can easily keep two 3-yd shovels busy. To do the same job with wagon drills you probably would need at least four rigs and three times the crew.

Besides, a wagon drill's effectiveness decreases sharply in a hole deeper than 15 ft. But the big units can drill nearly as well at 60 ft as they can at 15 ft. Most common depth, however, is about 25 ft, because 3½-yd. shovels can handle a lift that high. Deeper shots require bigger shovels, like the one on the previous page. Or they can be excavated in two lifts by smaller shovels. But most contractors try to avoid splitting shots.

Regardless of the method of excavating, large-hole drills are here to stay. Contractors like them because they cut costs, and operators prefer them because they eliminate dust and reduce hand-work to a minimum.



HYDRAULIC WRENCH breaks joint to remove drill steel. Rig virtually eliminates hand-work. Air-driven hoist handles 20-ft pieces of drill steel, and special changer easily places them in or out of drilling position. Hydraulic jacks level unit on uneven terrain. All controls are operated from cab, which provides good view of drilling. When hole is completed, rig quickly extracts steel and hammer, lifts jacks, and moves to new position. Jacks are then lowered to firm areas of ground, and operator levels rig.



REVOLUTIONARY HAMMER connects directly to bit and actually follows it down the hole. Air travels down hollow drill steel, powers 4-ft long hammer and also blows out cuttings. In this way, no drilling power is wasted in overcoming inertia of long lengths of heavy drill steel, a common problem in conventional drills. Independent rotation, which comes from air-motor on Drillmaster's rotary drill-head, is useful in drilling broken ground. Chain-type drill feed is powered by air motor.

Tractor Drills Are Compact

• Some of the neatest-looking contractor-made tractor drills on the Turnpike are operated by Badgett Mine Stripping and Construction Co. Badgett has been mounting wagon-drill masts on tractors for years, and he really knows how to make a compact unit. In boulder-covered areas, he finds them indispensable for drilling top lifts.



V-BELTS transmit power from rear take-off to Worthington 600-cfm compressor mounted on side of old Caterpillar D8 tractor. Side-mounting makes unit more compact than conventional rig with rear-mounted compressor. Self-contained units pay off because they travel anywhere, cut labor costs.



U-FRAME on front of tractor mounts two extra-long drilling masts and doubles as air-receiver. Made of 12-in. welded pipe, the frame eliminates awkward receiver tank and also provides efficient drilling device. Air outlets are conveniently located for operators. Masts rotate on cross-bar for drilling at any angle.



Portable Plant Crushes 150 Tph

• A brand-new Cedarapids portable crushing plant is really going through its paces at the north end of the Turnpike. Operated by Susquehanna Quarry Co. for Gasparini Excavating Co., the plant produces 150 tph of crushed stone for sub-base. It consists of three portable units—a primary crusher, a Commander secondary crushing and

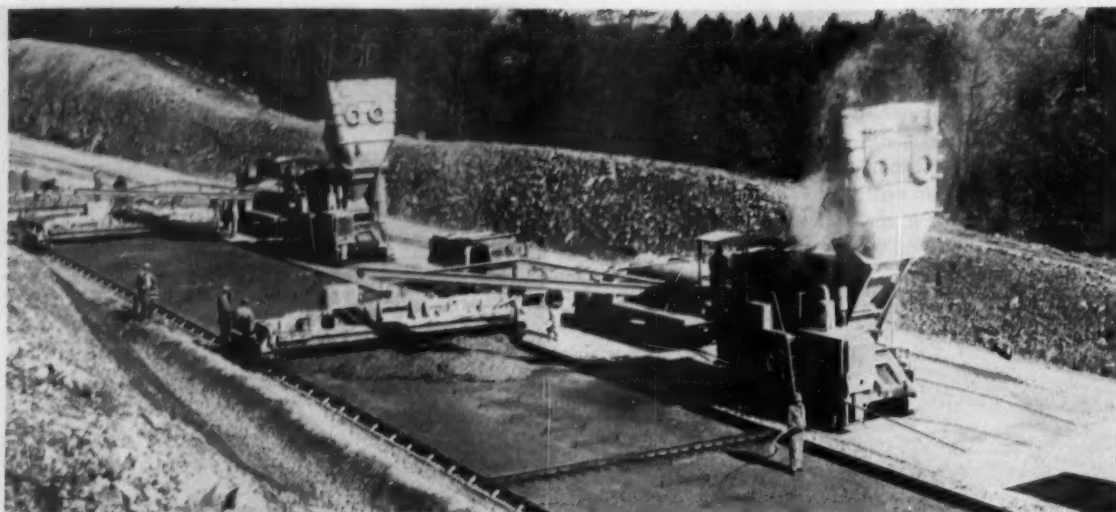
screening unit, and a truck-loading hopper.

Rock is excavated from an abandoned strip mine in the path of the Turnpike and hauled a short distance to the plant. It is dumped into a hopper, fed to a 2542 jaw crusher, and then conveyed to the secondary plant. Here, the material drops into a reciprocating feeder and hopper which

transfers it to an elevating return-wheel for handling.

From the wheel, the stone is conveyed to screens which grade it into four sizes. Oversize goes to either a 1036 jaw-crusher or a 2530 roll-crusher. Properly-sized material is conveyed directly to the truck-loading hopper, and fines are stockpiled on the side for later use as choker dust. The entire plant, including all belts and feeders, is powered by two General Motors diesel engines. Job calls for about 75,000 tons.

Big Job Demands Big Tools... Continued



SKIPS on two Multifoote pavers raise high to dump dry batches into dual-drum mixers. Leading paver places mix in front of Blaw-Knox spreader which levels it off 7 in. thick and 24 ft wide. Fol-

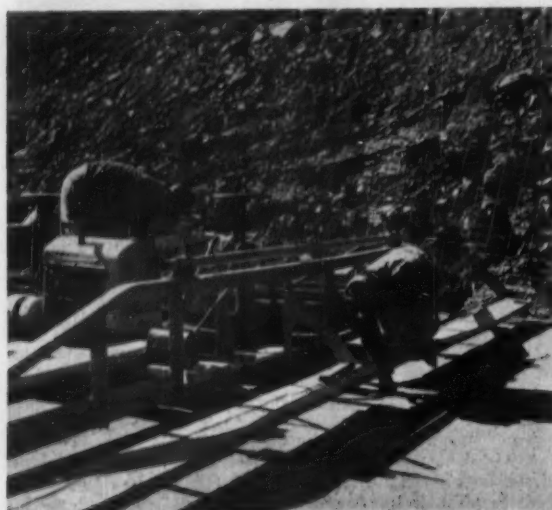
lowing paver lays top 3 in. over welded wire fabric until it catches up each time with lead paver. Then it helps lay bottom lift. Note longitudinal joint dowels set up between forms.

Dual-Lane Paving Method Makes Only Two Passes

• Paving two 12-ft lanes at once pays big dividends to progressive contractors who are employing it on the Pennsylvania Turnpike. It takes big equipment, but it cuts the number of operations in half. Form-setting, finegrading, joint-placing, concrete pouring, finishing, and curing are done only once. Normal paving requires four separate passes, and it often delays shoulder and cleanup work. Dual-lane paving, however, makes the job more efficient. Key to the operation is placing center joint, shown below.

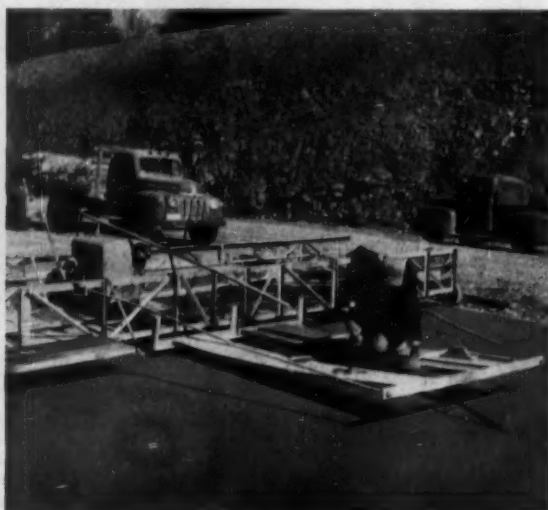


FINISHING SPREAD behind second paver consists of Blaw-Knox spreader, Jaeger transverse finisher, Koehring longitudinal bull float, and Heltzel joint-strip placer.



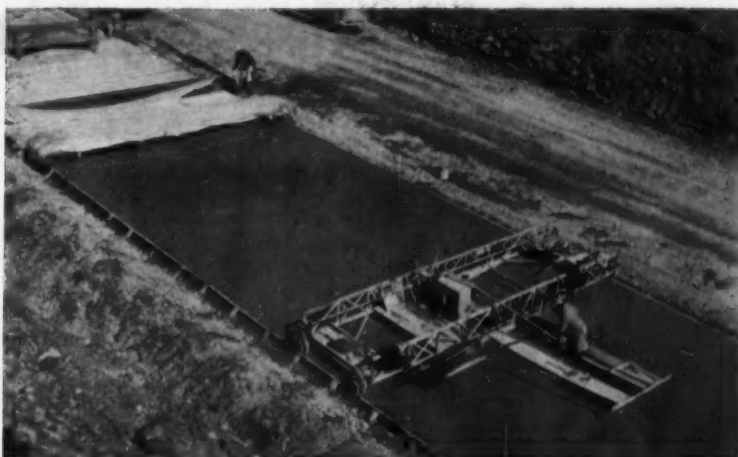
Joint Strip Goes In . . .

Metal strip 6 ft long for making longitudinal joint is inserted into fresh concrete. Heltzel machine guides strip into position.

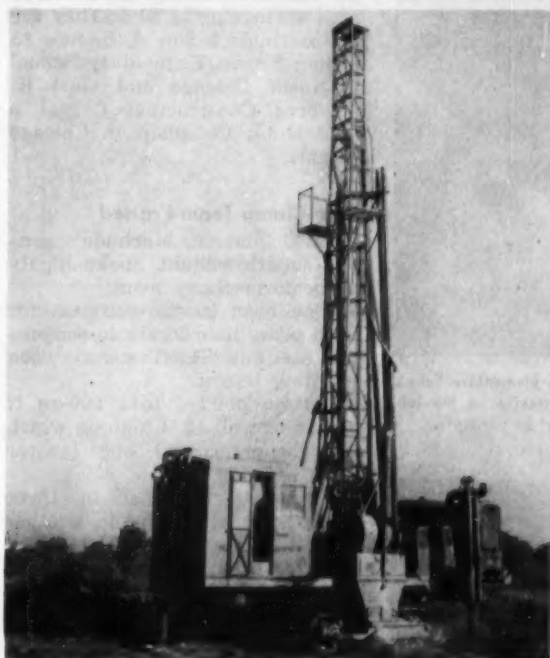


. . . Here It Comes Out

Same strip is pulled out of setting concrete about 1,000 ft behind finishing spread. See photo top of next page.



JOINT-MAKING RIG is contractor-modified Heltzel curing machine. Workman kneels on planks suspended by rods from top of rig. He pulls metal strip out of concrete and places it on shelf near by. Reaching down between planks, he finishes joint with edging tools and then moves ahead to next strip. Workman never has to leave platform, because he can move himself ahead by operating extended control arm on engine. This saves labor normally required to move finishing bridge ahead. Behind joint rig, two other workmen lift burlap curing strips from trailer and place them over concrete. Down hill, trailer is pushed easily by hand, but up hill, it is pulled by joint machine.



STONE DUST blows out of dust collector as Joy Champion drills 7 $\frac{3}{4}$ -in. hole down to roof of abandoned coal mine. Contractor uses eight rigs, each averaging 200 ft of hole in 8 hr.



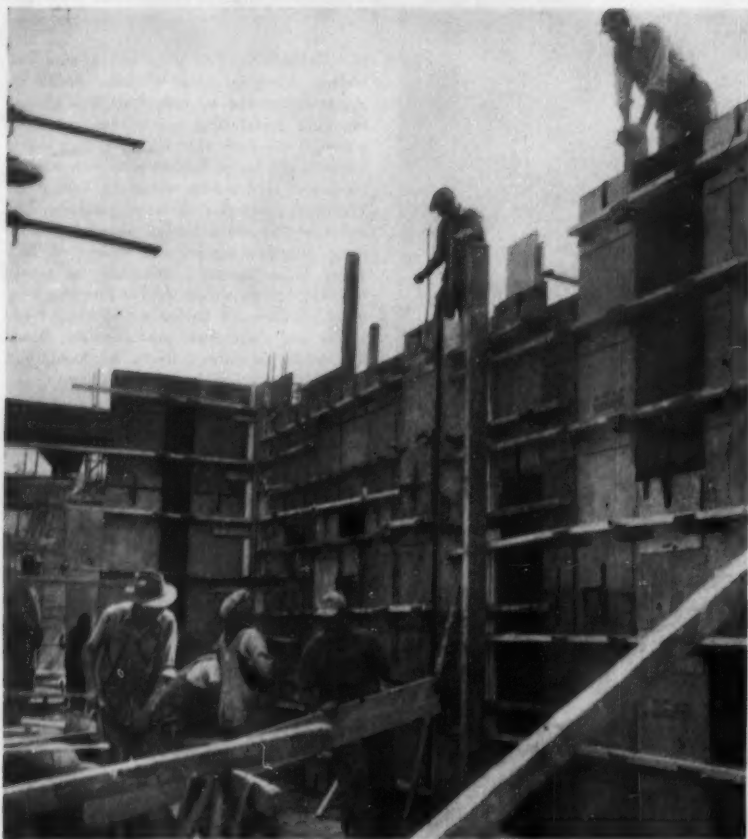
PIPE CASING 6 in. in dia is driven by Bucyrus-Erie rig, and then pulled out after slushing. If pipe gets stuck before slushing of upper mine levels, its bottom is blown off at each level.

Mine Slushing Prevents Settling of Road Fills

• Honeycombs of abandoned coal mines under the Turnpike right-of-way near Scranton are being filled up to prevent settlement. But it's not an easy job. Mines are hundreds of feet down, criss-cross each other, and often consist of three and four levels. Following maps supplied by the mine owners, Manu-Mine Research and Development Co. is driving thousands of 7 $\frac{3}{4}$ -in. holes through rock from 140 to 285 ft deep. When a hole reaches a bottom level it is cased with a pipe. Sand and silt are then slushed down to fill up the mine.



SILT AND SAND are dumped into portable funnel as workmen slush material down hole with water jets. Underground, water seeps off as sand and silt build up inside mine.



FORMING GOES UP at rate of 125 sq ft an hour at \$3 million Brown Elementary School in North Chicago. Leo Machuda & Son of Chicago, the general contractor on the job, erects and braces this new type, lightweight wood form at a cost of about 6c per sq ft.



PANEL WEIGHS less than 5 psf. Hooked steel straps fitted to panel insure secure fit.



ONE BLOW of hammer, on head of integral tie wedge, locks form and tie.

Three-Way Clamp

A **THREE-WAY CLAMP** has made possible the development of a new foundation form that cuts forming labor costs 50%.

The form is just a 1½-in. thick piece of plywood, but the unusual combination clamp makes it fast and easy to erect.

One blow of a carpenter's hammer 1) draws the panel forms tightly together and locks them; 2) secures the snap ties and lines up the form faces.

Two Chicago contractors are using the form-clamp. Both claim labor savings up to 50%. They are Leo Machuda & Son at the new \$3 million Brown Elementary School in North Chicago and Gust K. Newberg Construction Co. at a Ford Motor Co. plant in Chicago Heights.

Form-Clamp Team Praised

David Jonsson, Machuda's general superintendent, spoke highly of the form-clamp team.

"I've been in the business for more years than I care to remember," he said. "But I've never seen anything like it."

Jonsson pointed to a 500-sq ft section of wall 12 ft high on which one carpenter and one laborer were working.

"They erected that in three hours," he said. "And in another hour the form will be braced and ready for concrete."

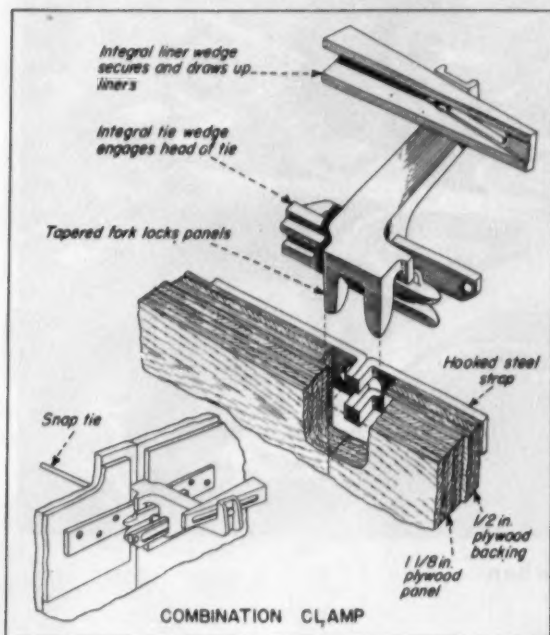
If you figure one laborer at \$2.55 and one carpenter at \$3.40 an hour, then add a 20% mark-up, you arrive at a remarkable forming and bracing unit cost of about 6c a sq ft. This compares with better than 12c a sq ft for conventional methods.

Form Stacks Easily

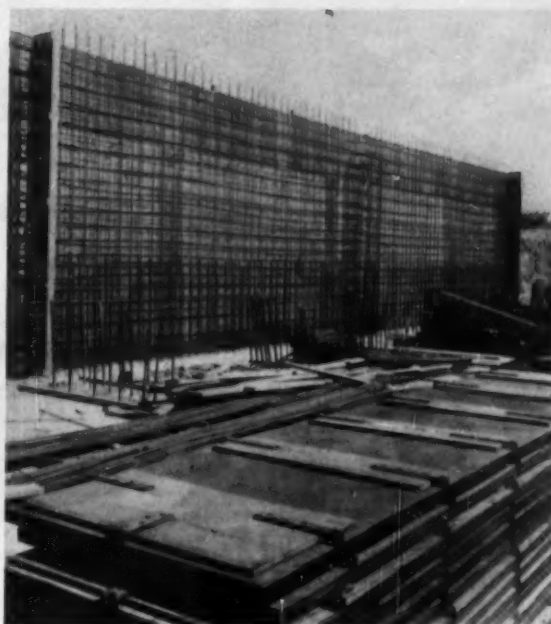
The patented All-Ply panel form is manufactured by Superior Concrete Accessories of Chicago. The firm says the panels embody an entirely new principle in form design. There are no metal or wooden frames (though some hardware is needed). Superior claims the panels can be used for up to 100 pours. Weighing less than 5 psf, the panels are easily moved, and their flush design permits stacking up to 7,500 sq ft of form on a single panel truck.

But the form is possible only because of the clamp.

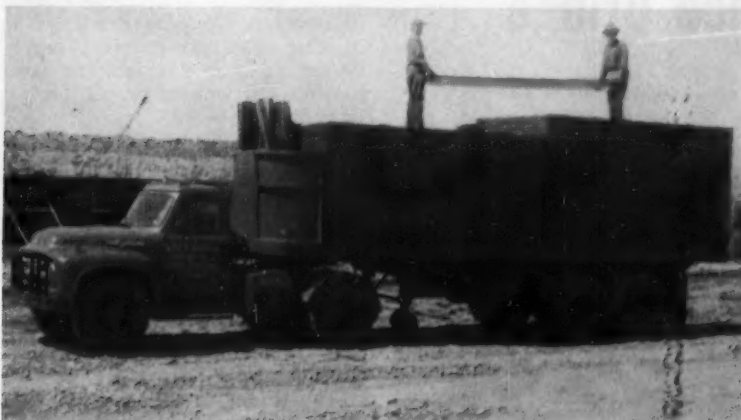
and Frameless Panel Cut Forming Labor Costs



COMBINATION CLAMP does three separate jobs: It locks the panels; it secures the snap tie head with its integral tie wedge; and it provides a seat which secures and draws up wooden liners.



FLUSH DESIGN simplifies stacking the forms at the job site. Plywood face and rigid locking of form by clamp insure clean, true concrete surfaces. Job shown is Chicago Ford Motor Co. plant.



COST OF MOVING All-Ply panels is considerably reduced. The form's design permits stacking up to 7,500 sq ft of panels on a single truck. Superior Concrete Accessories of Chicago makes and sells forms and clamps at an average price of about \$1.35 a sq ft.

A tapered fork in the clamp is seated in two adjacent hooks and is driven home by a hammer. The tapered design draws and locks the panels so tightly together that there is no seepage of concrete.

When the panels are locked together on the first side of the form, snap ties are inserted through a

notched brace in the panel. This is done after each panel is erected or after an entire section of panels is in place.

Workmen can insert the snap ties from the outer face of the panels at any stage of erection. The integral tie wedge then engages the head of the tie, which acts as

both spreader and tie. The wedge that secures the tie also lines up the faces of the joined panels.

The combination clamp has an integral liner wedge for securing and drawing up the liners. These generally are required on only one side.

The average price of the All-Ply form panel is \$1 per sq ft. A combination clamp is required for every 4 sq ft. The price of these clamps, together with other miscellaneous hardware, brings the cost of both panel and hardware to approximately \$1.35 per sq ft. Panels come in standard sizes of 2x4, 2x6, and 2x8 ft. Superior also supplies special corner and odd panels as required.

Fillers

The All-Ply panels come with a variety of fillers which include panel fillers, used in place of regular panels where odd sizes are called for; spring steel plate fillers, used where openings to be filled are less than 12 in.; and nominal lumber and plywood fillers used to supplement the combination clamp.



It's no easy job to build a traffic interchange when . . .

A Curve Complicates Post-Tensioned Bridge

By DON V. PURINGTON, Resident Bridge Engineer, City of Houston



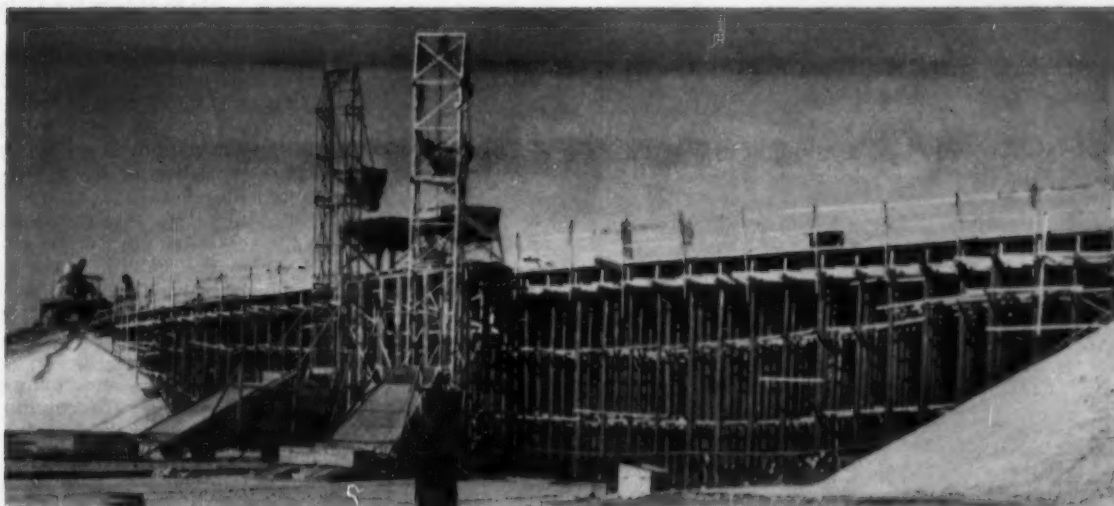
SHALLOW DECK rests on three rows of six tapered, elliptical steel columns. Unusual design of bridge made possible substantial savings in cost of 70-acre traffic interchange.

FIRST BRIDGE OF ITS KIND in the Western Hemisphere now is carrying traffic in downtown Houston, Tex. It is a continuous, flat-slab, post-tensioned concrete bridge, built by Constructors, Inc., of Houston. Construction posed a number of unusual problems in job layout, falsework design, and tensioning, partly because the bridge is built on a curve.

This design is popular in Europe because it takes advantage of the cheap labor available there and affords a savings in steel. In Houston, the cost was slightly higher than for a structure of conventional design. But its shallow deck made possible a sizable saving in the over-all cost of a 70-acre, clover-leaf traffic interchange at Waugh and Memorial Drives.

The bridge is a part of Waugh Drive, whose elevation was fixed by an existing bridge over Buffalo Bayou. The new Memorial Drive was cut beneath the bridge. Because the elevation of the top of the slab was fixed, every foot of superstructure thickness meant another foot of excavation at the base of the clover leaf to maintain the legal vertical clearance for Memorial Drive.

The bridge is 225 ft long, 72 ft wide, and only 20 to 24 in. thick. It is built on a 7.5 deg horizontal curve at the apex of a plus 1.45%



PINE POLES support the deck of the curving, skewed bridge during construction. Abutments were stair-stepped temporarily to support poles at either end and later grouted to smooth contours. Two Mixermobiles lift concrete to hoppers on buggy runway.



CABLE CONDUITS house $\frac{1}{4}$ -in. high tensile strength steel wire. Contractor used 58 sets of cable conduits, each consisting of three conduits placed one above the other.

grade and a minus 1.5% grade. It is super-elevated at a rate of 0.057 ft per ft of width, making a difference of more than 4 ft in elevation from side to side.

Spans are 45, 65, 70, and 45 ft. The slab rests on three rows of six tapered, elliptical, steel columns, hinged at the bottom. They have a top ellipse of 18x24 in. and a bottom ellipse of 12x16 in. at the pin-connected casting. Cast steel rockers support the ends of the slab.

Original bid for the bridge was \$202,000, or about \$9.80 per sq ft as compared with \$7.50 per sq ft

for conventional rigid frame structures in the same region.

Constructors, Inc., studied three possible methods of building more than 16,000 sq ft of slab form from 14 to 19 ft in the air. The most obvious method was to lay the forms directly on the ground and complete the Memorial Drive cut after the bridge was completed. But that would require trench excavations for the two abutments and three bents almost 100 ft long, 10 ft wide and 27 ft deep. And the nature of the soil would make necessary continuous sheeting for virtually the full depth.

Second, the contractor considered making the cut for Memorial Drive and driving timber piling to support the deck forms. This would disturb the subgrade of the lower roadway and cause considerable delay in completing the pavement on Memorial Drive.

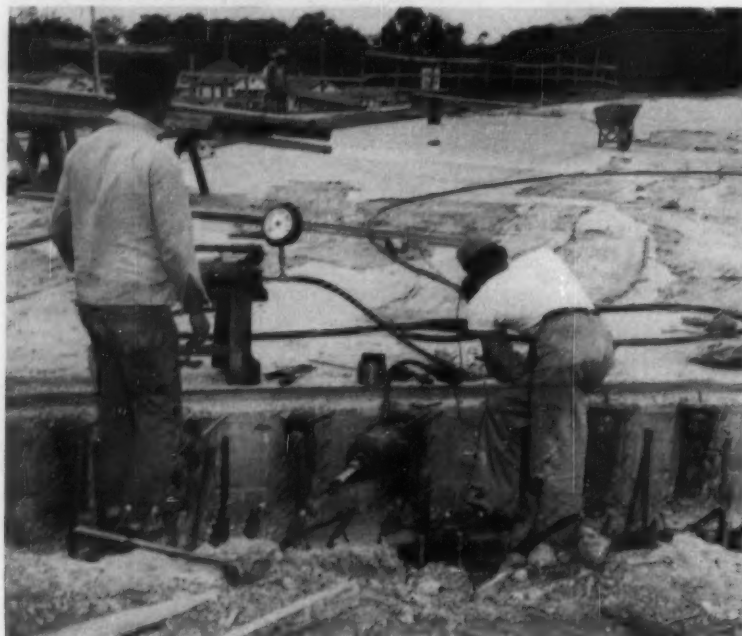
So the contractor adopted this plan: First, he made the lower roadway cut and excavated for the footings. He drove 40-ft steel H-beams for the foundation piling and cast the concrete footings in place. Then, he completed all concrete paving beneath the bridge, including the required slope protection paving, and placed timber sills on top of this paving. The falsework went up from there.

Falsework

From the clearing of a near-by subdivision, the contractor obtained pine poles with a minimum dia of 5 in. for falsework. He set them upright on the sills in groups of five and tied them in position with 2x4 braces, cut off directly at grade and capped with 6x6's.

On the slope protection paving, the contractor developed an ingenious setting for the timber sills. He supported 6x6 timbers in proper position on the slopes before placing the slope pavement. Beneath each timber, he placed a 5-in. reinforced concrete beam and inserted No. 3 dowels in it to hold the concrete plug on the slope pavement after the 6x6's were removed.

Even though the bridge was curved, specifications required that the tensioning cables be of equal length. To maintain these equal



HYDRAULIC JACKS engage both ends of a set of wires at the same time and introduce an initial stress of 13,600 psi. After 28 days full stress of 136,000 psi is applied.

lengths across the full width of the bridge, it was necessary to skew the center lines of the supporting columns at rather sharp angles. Constructors, Inc., solved this problem by setting the falsework caps approximately parallel to the center lines of the column bents and on the slope of the super-elevation grade.

Cut-Off Grades

How to establish cut-off grades for the 1,830 pine poles was another problem. It would require eight-place trigonometric tables to locate any point not on the center line of the bridge and establish the required elevation. In addition, it would be necessary to compute the vertical curve grades plus or minus the super-elevation slopes.

The contractor devised a better method. Although the center radius point of the horizontal curve was inaccessible, there was room to establish a parallel curve at half the radius. So 10-ft radial points were established on the center line and corresponding hubs on the parallel curve at half the radius. This made it possible to transfer the radial lines from the ground to any horizontal plane on the bridge with a transit.

But the lines of poles were not on the radial lines. Instead, they were approximately parallel to the bents. To solve the problem, the contrac-

tor set taut strings on the radial lines at cut-off grade, then crossed them with other strings parallel to the bent lines. These cross-strings, when in contact with the radial strings, established the pole cut-off elevations. Cut-offs were made with one-man electric saws using 2x4 ribbons for guides. Few wedges were needed to take up irregularities in the saw cuts. Constructors, Inc., erected the falsework for the entire bridge in 18 days.

Reinforcing Steel

The ratio of steel to concrete was about 68 lb per cu yd. Reinforcing steel for the slab was light, but the steel cages over the supporting columns—which formed an internal cap within the slab—were relatively heavy.

The post-tensioning cables were ¼-in., high tensile strength, steel wires. There were 58 sets of cable conduits, each set consisting of three conduits placed one above the other and located concentrically with the curve of the bridge. The top and bottom conduits contained 10 wires; the middle conduit, eight wires. The cable subcontractor, Texas Stressed Concrete Co., furnished steel chairs with concrete block bases to maintain the catenary position of the cables.

Specifications called for discontinuous tubular voids between the tensioning cables and between the

supporting bents to reduce the slab dead load. These voids were formed by 925 treated Sonovoid tubes with sealed ends. They displaced a total of 134 cu yd of concrete.

After the general contractor placed the bottom mat of reinforcing steel—consisting of No. 4 bars on 5 ft centers—on the plywood deck, the cable contractor strung the cable sets in 10 days with six men. When the cables were in place, the general contractor placed the tubes on field-fabricated steel supports and tied them to the deck form with steel tie wire.

The cage steel—consisting mainly of No. 8 bars over the column bents—then was laced through the tensioning cables, and the top mat of steel (identical to the bottom mat) was placed.

Concrete Placement

Nearly 1,000 cu yd of 5,000-lb compressive strength concrete had to be placed in one continuous pour over 16,000 sq ft of deck. Constructors, Inc., chose to mix the concrete on the site and place it with hand-propelled concrete buggies. For this, the contractor used two 2-yd Mixermobiles with tower hoists of sufficient height to lift the concrete to hoppers on a buggy runway at the center of the bridge. A 1-yd Multi-foote Paver and a 1-yd Koehring paver placed concrete in the end spans from the embankment.

The grade for the top of the slab was established by 1½-in. pipe screeds set on the radial lines. Hand strike-offs riding on the screeds graded the concrete, and bull floats, operated in a longitudinal direction from the movable buggy runways, compacted and smoothed the top surface.

As the contractor began to apply Hunt curing compound, air bubbles appeared at random over the ends of the encased cardboard tubes. An investigation showed that a pressure problem had been created by a rise in the temperature of the air entrapped in the cardboard tubes. When concrete placement began, air temperature was 37 deg. The initial setting temperature of seven-sack concrete can reach 165 deg.

Under pressure of this sort, air in the tubes had pushed escape channels through the concrete wherever it could. Where it could not escape, it expanded the tube and created longitudinal cracks in the slab, some on top, some on the bottom. So far these cracks have not impaired the usefulness of the structure.

Stressing

Three days after the placing of the concrete slab, the cable subcontractor began initial stressing of the cables. A special split ring, which engaged upset knobs on the ends of the wires, and two 100-ton Simplex jacks, which engaged both ends of a set of wires at the same time, introduced a stress of approximately 13,600 psi. This was sufficient to release the load on the falsework and raise the slab from 1/16 to 3/8 in. at the centers of the spans. At the end of 28 days, the full 136,000 psi was applied to each

cable. A telephone system helped synchronize the simultaneous application of stress at each end of the bridge.

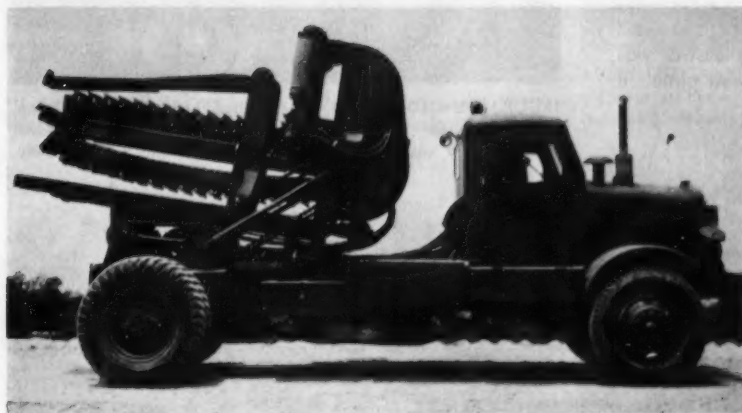
At the end of 42 days, each cable was checked by hooking up the jacks and bringing the pressure up to the required minimum, or to the break-out point. There was no indication of any loss of tension on any of the cables.

While the cable stressing was in progress, the general contractor formed and placed the concrete sidewalks on both sides of the bridge and erected the handrails. All that remained to be done after

the final check of the tensioning was to complete the tops of the abutments, fill the cable conduits with grout, and cover the cable anchorages with concrete.

L. B. Hall was general superintendent and John Hawkins, engineer and bridge superintendent for Constructors, Inc. Ted Gut was engineer and superintendent for Texas Stressed Concrete Co. Francis J. Niven and Associates of Houston designed the bridge. For the City of Houston, the work was under the supervision of J. M. Nagle, Director of Public Works, with the author as resident bridge inspector.

Army Engineers Test Experimental Trenches



Photos—Corps of Engineers, U. S. Army



PRESENTLY UNDERGOING TESTS at the Engineer Research & Development Laboratories, Fort Belvoir, Va., Corps of Engineers, U. S. Army are these two new rubber-tired trenchers.

The top photo shows a Pewther model UD trencher mounted on a Euclid chassis. Powered with a GMC 4-71 engine, rated at 114 hp, the unit will dig 24 fpm at a 4-ft depth, with a maximum cut 6 3/4 ft deep. Buckets are 2 ft wide, 40 in. all. Buckets alternate with six teeth on one, seven on the next. The rig has a hydraulic crowd and conveyor, automatic slip clutch for obstruction obstacles. It also has side leveling jacks that will handle up to 11 deg.

The Barber-Greene trencher is more powerful, being rated at 154 hp. Power comes from an International UD-18A engine. The frame, built by Barber-Greene, has a Fuller transmission and Euclid rear axle. It will dig at the rate of 28 fpm at a 4-ft depth, with a maximum cut 6 ft deep. It has 21 buckets, 2 ft wide. It also uses a hydraulic crowd and drive and utilizes an automatic slip clutch for obstructions.

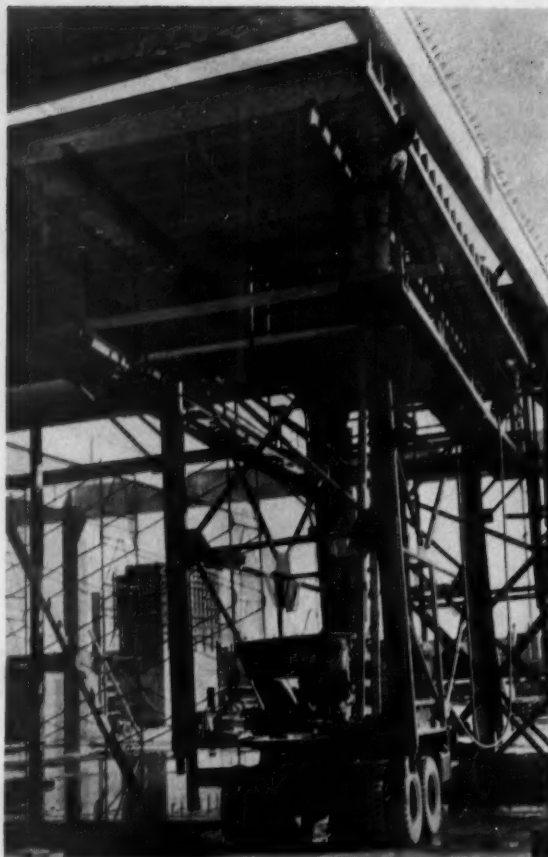
Both trenchers are undergoing tests at Fort Belvoir to enable the Corps of Engineers to study the feasibility of rubber-tired trenching machines.

Job-Made Rigs Prove Ingenuity Pays Dividends

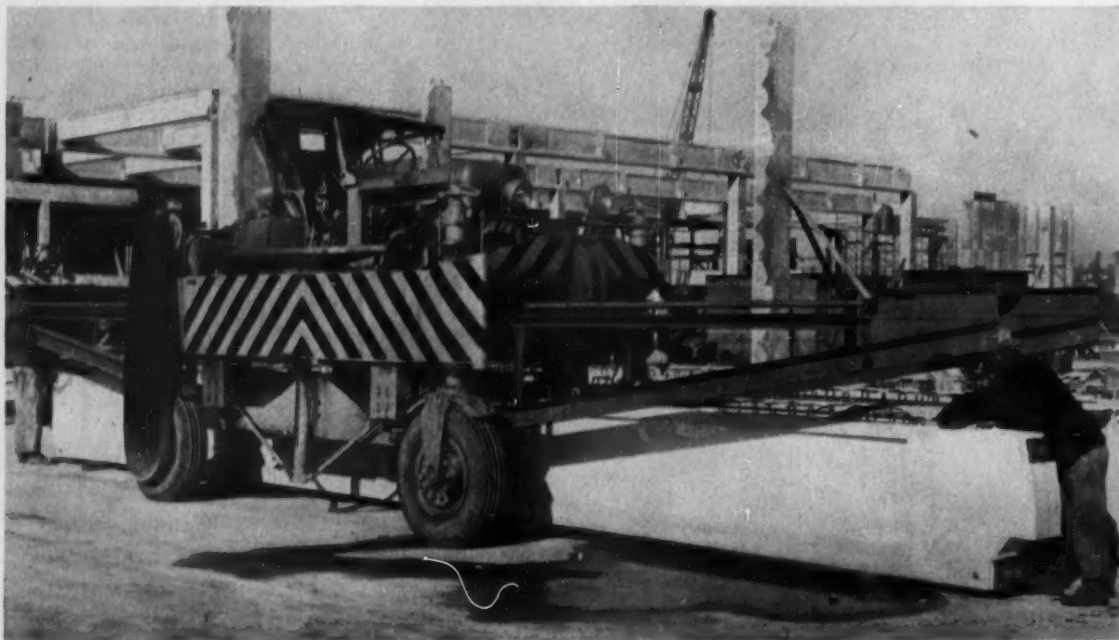
SKILLFUL MODIFYING of standard equipment to fit the needs of a specialized operation gives a contractor a big edge on his competitors. Often it requires only a few new brackets, simple welding, or several extra bolts to make a rig do a brand new job.

To the right is pictured a job-made jumbo that eliminates the need for a forest of scaffolding and also extra cranes for placing roof forms. Its platform holds up to seven men, who often remain aloft during an entire shift.

Another interesting rig-modification is the fork-lift truck shown on the opposite page. A contractor working on the rehabilitation of a pier in Hoboken, N.J. was having trouble removing rubble. Specifications required that he dump the material through a window, where it could drop down a chute and into a barge. He tried a front-end loader, but the sides on the bucket restricted the amount of twisted material that it could handle. The best answer was a fork-lift truck holding a loosely chained plate. It was simple, but it paid off.

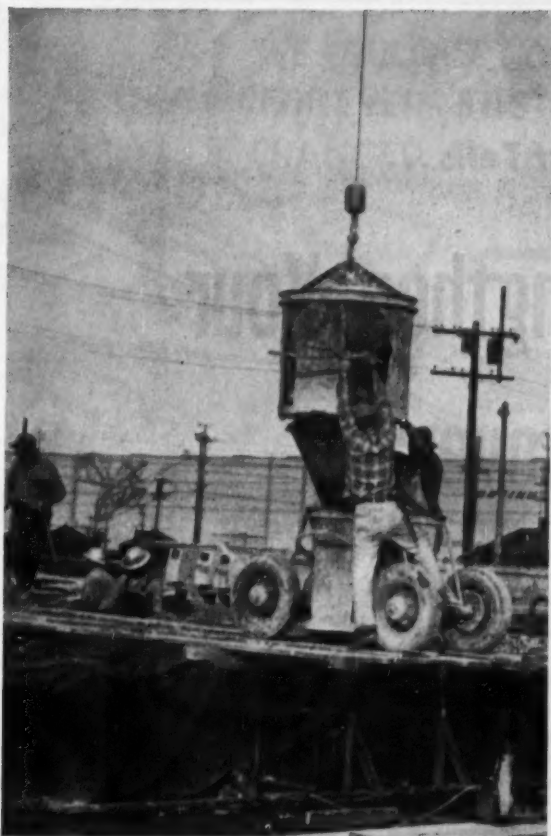


TRUCK-MOUNTED JUMBO places, strips, and moves form panel for 14x40-ft roof slab. Electrically powered top platform moves 18 in. forward and backward, 12 in. sideways, and 9 ft vertically.



OUTRIGGERS added to front and back of Hyster straddle truck reach pickup points on precast beam. Suction-pad could not be

used because of projecting reinforcing bars on top flange. Job is big warehouse at Boeing Airplane Co. in Seattle, Wash.



WHEEL-MOUNTED BUCKET rides on wood runway set up over forms for precast beams. Crane-hung bucket dumps batch and returns for refilling as mobile bucket quickly distributes concrete.



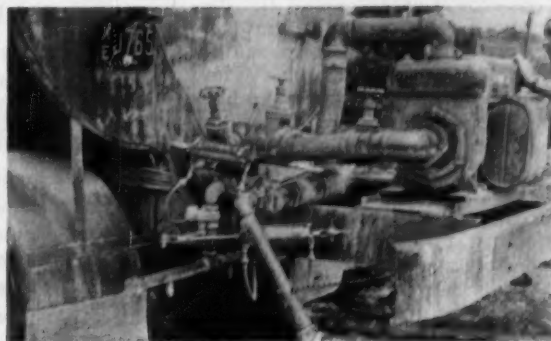
LONG STEEL BEAM extending from bucket converts Hough Pay-loader into crane for handling miles of barricade on New Jersey Turnpike widening job. Short beams act as forks for carrying forms.



ACETYLENE TANKS on maintenance truck are easy to get at. They are mounted horizontally in brackets welded to top of tool cabinets. Hose and torches are kept in handy closet.



STEEL PLATE chained loosely to forks on Towmotor truck easily scrapes up big load of debris. To dump, operator tilts vertical shaft forward, then plate shifts ahead and pivots on front of forks.



VALVES on spray-bar lines are easily operated pneumatically by driver from cab of tank truck. Air is tapped off brake lines and fed into cylinders that open and close valves.

A Construction Insurance Expert Tells...

How to Strengthen Your Liability Coverage

By EDWARD G. ARMITAGE

Partner, Armitage & Co.

Are you signing "hold-harmless" agreements when you use dealers' purchase orders to buy materials? Are you bidding on a job that is a new type of work for you? In this article, the second of a three-part CM&E series, a broker who has been handling contractors' insurance for 22 years explains the dangerous exclusions found in liability policies and tells you how to obtain better coverages.

A COMPLEX TYPE of construction insurance is that which the contractor must carry to offset losses arising from his liability for the bodily injuries or property damage his operations may inflict on others.

Do not confuse liability insurance—the insurance companies call it defense coverage—with the insurance you carry to protect against losses to your own equipment and property or property for which you are responsible. Liability insurance is designed to defend you against legal actions brought against you by a third party. It will not reimburse you for loss to your own property or property for which you are responsible.

It has become common practice for most contractors to make the Comprehensive Liability form the basis of their coverage. It appears to be better suited to the construction field than the alternative form,

called Contractors' and Manufacturers' Schedule.

I do not have to tell you that the provisions of Comprehensive General Liability are not as all-inclusive as the name implies. There are many specific exclusions mentioned in the policy and also many important gaps in the coverage under the basic policy.

Comprehensive General Liability usually includes: 1) Contractor's Legal Liability clause, which offers protection against your own acts, negligences, or omissions for which you are legally responsible and 2) Contractor's Protective, which protects against loss resulting from your liability for the operations of a subcontractor.

I contend that the contractor who limits his liability insurance

to these divisions, important as they are, is leaving himself open to costly losses because they protect against losses for only a part of the liability the contractor assumes.

One of the important additional coverages you should consider is Contractual Liability as protection against "hold - harmless" clauses. These clauses, with which you are only too familiar, usually are found in owners' contracts. When you accept a "hold-harmless" clause by signing a job contract, you are assuming a greater degree of liability than is required by law.

The competitive construction market usually makes it necessary for you to assume this additional

(Continued on page 68)

• Your basic liability policy covers:

1. Acts, errors, or omissions for which you are legally responsible.
2. Your liability for the operations of your subcontractors.

• Your basic liability policy does not cover:

1. Responsibility you assume through "hold-harmless" clauses.
2. Damage to property during demolition work.
3. Collapse due to excavation, tunneling, shoring, or underpinning.
4. Damage to property from blasting or explosion.
5. Damage to underground utilities during excavation or drilling.
6. Damage to property under your "care, custody, or control."
7. Damage occurring at a job after you have completed the work.
8. Auto liability.



Down time is no joke.

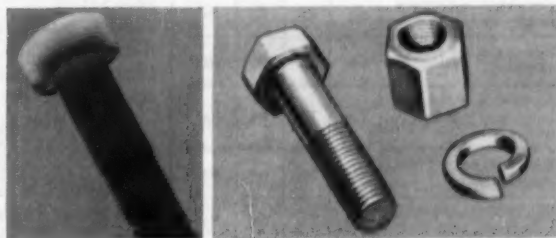
But it happens at times when track hardware gives out.

If you replace with genuine Caterpillar hardware, here's what you're sure of: bolts, nuts, capscrews and lock washers made from prechecked fine-grade steels, carefully hardened and tested, finished to the strictest specifications in the industry. You're sure of longer wear life, no matter how tough your jobs come. You're sure of less down time in the future.

If you replace with non-genuine hardware—can you be sure of anything?

Better get Caterpillar parts every time.

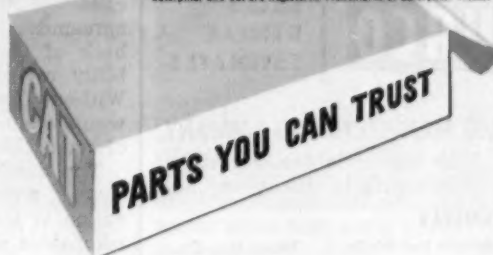
Caterpillar Tractor Co., Peoria, Illinois, U.S.A.



On the surface, CAT® hardware looks like ordinary kind. But etched cross section of newly designed track bolt (left) shows depth of special "Hi-Electro" hardening penetration in bolt head.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.



WHY WACO IS YOUR SOUNDEST INVESTMENT IN SCAFFOLDING

Check the table below...

COMPARE THE FEATURES OF WACO with those of three other nationally-known brands of scaffolding.

You'll find WACO is the only scaffolding offering all these features as standard equipment at no extra cost. You'll find as thousands of other quality-minded contractors have found that WACO all-steel sectional scaffolding is recommended without reservation. Their unqualified acceptance of this safe, cost-cutting scaffolding is another proof of WACO's leadership in the scaffolding field.

Let this table tell you the plain truth about WACO Scaffolding. Let it tell you why WACO is your soundest scaffolding investment.

	WACO	BRAND A	BRAND B	BRAND C
Automatic fasteners as a part of all standard frames.	Yes	No	No	Yes
Floating type coupling pins for easy erection.	Yes	No	No	No
Built-in coupling pins on all frames.	Yes	No	No	Yes
All standard frames high carbon steel with built-in ladders.	Yes	No	No	No
Brace locks on the inside of frames.	Yes	Yes	Yes	No
High carbon steel pivoted cross braces.	Yes	Yes	Yes	No
Only one style bracket needed.	Yes	No	No	No
Number of parts for standard 5' x 7' section.	4	16	16	6

WACO

**SALES
RENTAL
ESTIMATES**

WACO MANUFACTURING COMPANY

3560 Wooddale Ave. South
Minneapolis 16, Minnesota

LICENSEES

Armson Iron Works
Ontario, Canada

Waco-May Co.
Los Angeles, Calif.

LIABILITY INSURANCE... Continued



HIGH-SPEED TRAFFIC makes this road-widening job dangerous. If an accident were to occur, contractor might be held responsible for bodily injury to driver and damage to car.

responsibility, if you are to get the job. But you must remember that your basic liability policy does not cover instances that become your responsibility—not because the law holds you liable; but because you have assumed additional liability by entering into a contract.

Many contracts require you to purchase Owners Protective insurance written in the owner's name to give him protection against legal actions. Many contractors assume that this provides them with indemnification against actions by the owner. This is not true.

"Hold-harmless" clauses may still be found in owner specifications, and without Contractual Liability you have no recourse with the insurance companies. Remember that Owners Protective is written in the owner's name and not in your name, although you may pay for it.

Also bear in mind that "hold-harmless" clauses are not limited to the owner's contract. I have seen them in specifications and even in purchase orders. I recall a contractor who unwittingly entered into a "hold-harmless" agreement when he submitted a purchase order—supplied by the dealer—to a ready-mix company. It held, in effect, that the dealer was no longer responsible for the actions of his truck or driver after the truck had entered the job site.

Legally the responsibility would normally be the dealer's, but because of the "hold-harmless" agreement in small print on the back of the order, the responsibility reverted to the contractor. Without Contractual Liability, he would assume the loss in the event of an accident.

You should remember that since there is a certain amount of duplication in the coverages, insurance companies will credit the amount of the premium paid for Owner's

Protective against the Contractual Liability premium.

The hazards and uncertainties of "hold-harmless" clauses are reason enough to be on intimate terms with your insurance broker. A careless interpretation of an owner's contract or specifications could wipe out a job's profit over night and tie up a good deal of working capital.

The cost of protection against "hold-harmless" clauses can be very high or very low, depending on the severity of the responsibility you assume. That makes it imperative to get a cost estimate from the insurance company before the job starts. The additional premium may be enough to make you reconsider your bid figure.

Another division of liability insurance often ignored is Completed Operations coverage. Unless Completed Operations coverage is specifically endorsed to the basic policy, the insurance company's liability ends when the job is completed. But your liability for acts of omission or commission carries over for the full period of the statute of limitations. In many cases, this is several years.

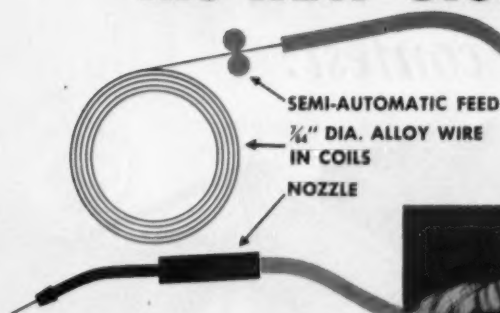
You may have removed all your equipment from an apartment house job, for example, when the ceiling plaster falls and injures an occupant. In such a situation it has become common practice for lawyers to drag any person they can into court. You would, of course, be joined in the action.

Even if you are not held liable for the accident, you would run up law bills defending against the action. If you were found liable, you would have to pay the judgment, even though you had been off the job for quite a while. Completed Operations is not expensive; its premium is usually charged at a specified rate for each \$1,000 of

(Continued from page 73)

(Advertisement)

SEMI-AUTOMATIC HARD-FACING with the NEW Stoody Alloy Tubular Wires



IN EARTH-WORKING AND CRUSHING OPERATIONS

This is a totally new hard-facing method utilizing the welding speed of the semi-automatic machine to produce sound deposits of wear-resistant alloys. The wires run bare, using no flux, so that the welder enjoys full visibility at all times...deposition rates at normal welding currents (200 to 300 amps) are double or triple those of the manual method...standard semi-automatic equipment is easily converted to handle Stoody wires.

Maintenance time and welding costs are reduced through increased service life provided by Stoody alloys and the greatly increased welding speed. Welders like the semi-automatic, find it easy to operate with less fatigue.

Your Stoody dealer (check the "yellow pages" of your phone book) will be glad to give you full information, plus a demonstration on your own equipment without obligation. Or write to the company for literature and the name of your nearest dealer.

STOODY COMPANY

11972 East Slauson Avenue
Whittier, California



BULLDOZER END BITS: Can be hard-faced in one third of time required by manual process. Stoody 121 is recommended.



SHOVEL BUCKETS: TEETH, LIPS, ADAPTERS, ETC., Stoody 121 gives good wear resistance, quickly covers wearing areas on this clamshell and other types of buckets.



ALL TYPES OF CRUSHERS: An ideal application for Stoody 100 because of excellent wear resistance and impact strength. Rolls can be hard-faced much faster with semi-automatic welder.

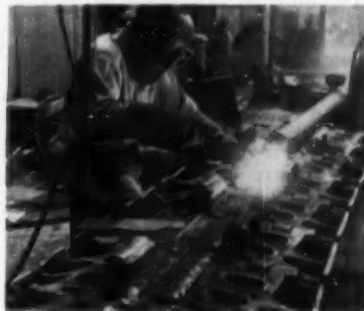


SCRAPER BLADES: Parallel beads of Stoody 121 are fast and easy to apply to scraper blades, add excellent wear resistance.

Stoody 100... a high chromium alloy wire for equipment subject to severe abrasion and impact. This is similar to Coated Tube Stoodite. Used on crushers, buckets, rippers, augers, tool joints. Deposits 10 to 18 pounds per hour.

Stoody 121... a medium alloy material with excellent resistance to abrasion and impact. This is similar to Stoody 21. For bucket teeth, shovels, grizzlies, loader lips, crushers. Deposits 9 to 16 pounds per hour.

Stoody Nickel Manganese... produces a Hadfield manganese deposit for build-up of all manganese parts—crushers, buckets, shovels, teeth—preparatory to hard-facing. Deposits 4 to 7 pounds per hour.



SHOVEL TRACK PADS: Use of Stoody Manganese applied by semi-automatic welder cuts time on maintenance.

In earthmoving contest:



Semi-automatic transmission tops torque converter drive!

An unusual earthmoving contest, to prove or disprove to a contractor the value of Fuller's new 9-speed Semi-Automatic R-1150 ROADRANGER® Transmission in scraper operation, recently caused much comment on one of the Nation's major turnpike construction projects.

For purposes of the test, the Fuller R-1150 was installed in place of another transmission in existing equipment . . . and operated in competition with a scraper equipped with torque converter-transmission combination.

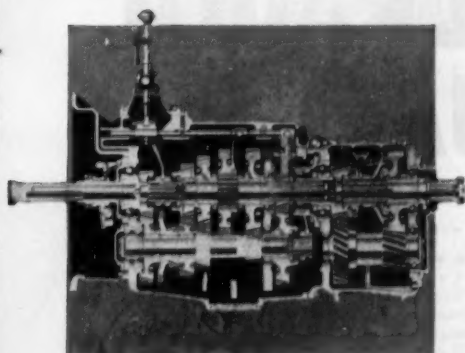
Scene of the contest was a 3400-foot run with favorable and adverse grades up to 15 per cent. The Fuller 9-speed Model R-1150 ROADRANGER® Trans-

mission, shifted with a single lever, was installed in an M-R-S 200 Tractor pulling a Caterpillar Model 90 Scraper of 25½ yards struck capacity. The tractor equipped with the torque converter combination pulled a scraper of 18 yards capacity. Material was sandy and moist with 25 per cent gravel and stone.

With the Semi-Automatic R-1150 ROADRANGER® Transmission, positive driver selection of each gear ratio to meet all conditions from borrow pit to dump resulted in greater fuel economy and faster trip time with 30 per cent larger loads. Complete comparative results are shown in the tabulation in the score card at the right.

The Fuller Model R-1150 is designed especially for trucks and tractors of up to 1150 cu. in. displacement and developing up to 800 foot pounds of torque. Advantages of the new transmission include:

1—Nine forward speeds in selective ratios, evenly and progressively spaced, *shifted with one lever*; 2—All-Air Control for quick and easy, pre-selected, automatic and synchronized range shifts; 3—Nine evenly-spaced ratios averaging 38 per cent steps; 4—More positive traction at drive wheels; 5—Greater fuel economy; and 6—Positive selection of operating ratios by the operator.



This Fuller Model R-1150 ROADRANGER® Transmission provides 9 selective and progressive ratios with NO gear splitting. Engines operate in peak hp range with greater fuel economy because of the short, evenly spaced steps between ratios.

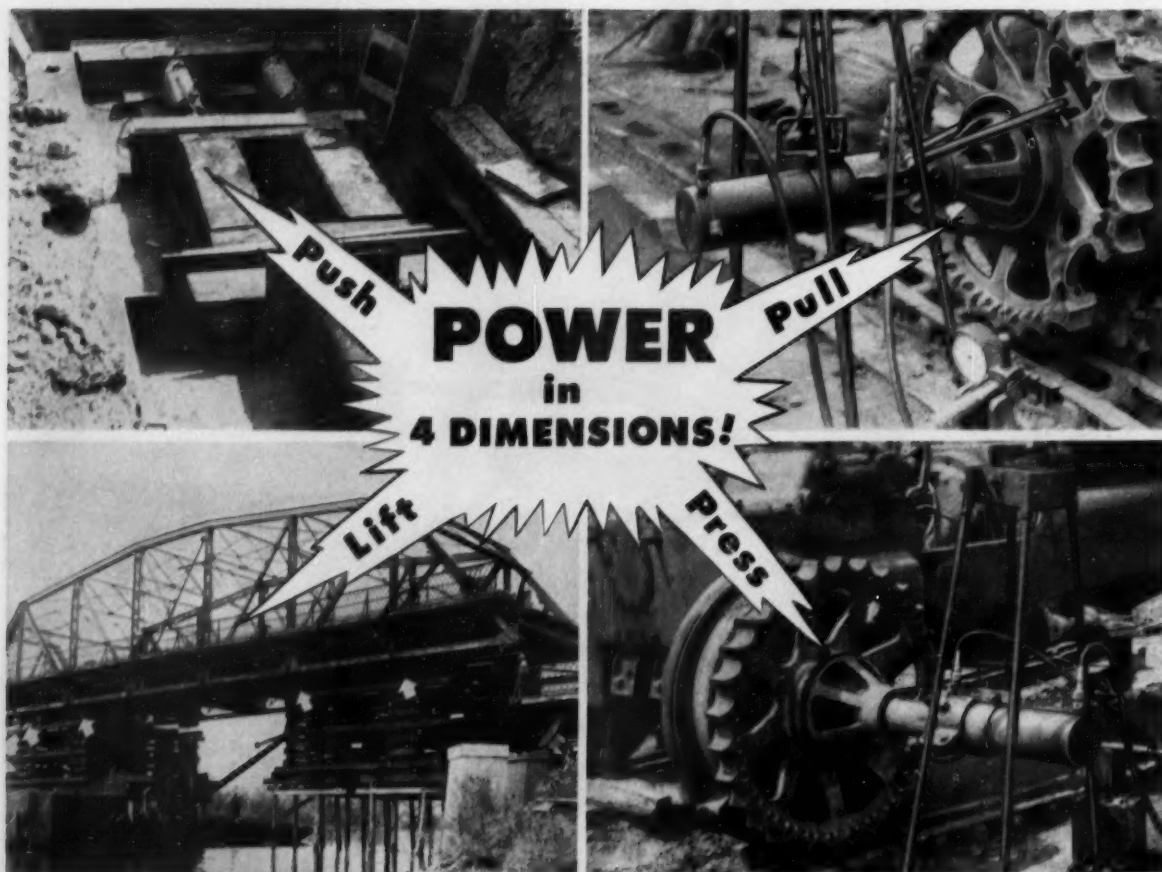


FULLER MANUFACTURING COMPANY
TRANSMISSION DIVISION • KALAMAZOO, MICH.

SCORE CARD

	M-R-S 200 25½-Yard Scraper Fuller R-1150 Transmission	18-Yard Scraper Torque Converter Transmission
Trips	9	8
Average loading time	1.41 minutes	1.29 minutes
Average cycle time	7.48 minutes	8.08 minutes
Estimated payload each trip, 80% bowl factor	20.4 yards	14.4 yards
Trips (50-minute hour)	6.68	6.19
Production on 50-minute hour .	136.27 yards	89.13 yards
Gross revenue at 20 cents a yard, for hauling only	\$ 27.25	\$ 17.83
Less Estimated Direct Costs . .	\$ 14.00	\$ 11.71
Gross Profit Hauling Only . . .	\$ 13.25	\$ 6.12
Ratio M-R-S Production	153%	100%
Ratio M-R-S Profit	217%	100%

Unit Drop Forge Div., Milwaukee 1, Wis. • Shuler Axle Co., Louisville, Ky. (Subsidiary) • Sales & Service, All Products, West. Dist. Branch, Oakland 4, Cal. and Southwest Dist. Office, Tulsa 3, Okla.



whatever your job...do it better with

When you need hundreds of tons of sheer power... power to push pipe or pull wheels, lift bridges or press sprockets... *You've got it* with Rodgers Hydraulic Jacking Units that deliver power in 4 dimensions!

EVERY JOB GOES FASTER, EASIER, at lower cost when Rodgers Jacking Units step in with their steady, precisely controlled power. Single and double acting jacking cylinders in capacities from 50 to 600 tons are available—ram travels from 6 to 48 inches are standard—up to 72 inches optional.

FOR THE REALLY BIG JOBS—like bridge raising—multiple jack installations, working from a single pump and control, deliver uniform power at all jacking stations.

Rodgers Jacking Units—cylinders, hoses, couplers, pumps and controls—are also offered with special attachments for tractor service and tunnel shield work.

PROMPT DELIVERY of Rodgers Hydraulic Jacking Units is usually possible from regional distributors or the factory.



TWO FREE CATALOGS

New Bulletin 321C describes Rodgers Portable Service Jacks for all mechanical pulling and pressing operations. Bulletin 317A describes Rodgers Jacking Units and accessories for construction jobs plus facts on typical jacking applications—send for both right away!

Rodgers Hydraulic Inc.

7403 WALKER STREET • MINNEAPOLIS 16, MINN.

RODGERS HYDRAULIC JACKS

POWER DRIVEN HYDRAULIC PUMPS

are available with either Wisconsin air cooled engines or electric motors. They produce 2.5 GPM at zero working pressure with a normal working range of 6,000 PSI and will attain momentary peak pressures of 10,000 PSI.



HAND OPERATED PUMPS

have three working pump speeds—first, 13 cubic inches per stroke at 3,000 PSI; second, 86 cubic inches per stroke at 5,000 PSI; third, 44 cubic inches per stroke at 10,000 PSI.





BLASTING JOBS are not covered by the basic liability policy. Other important exclusions include collapse due to excavation, tunneling, shoring or underpinning, and damage to underground utilities during excavation while using "mechanical equipment."



PROTECTIVE RAILINGS make this job as safe as possible, but if the bucket should fall, or a pedestrian walk in the path of a car, the contractor would still be responsible.

work completed in a policy year. Contractual Liability and Completed Operations are two important endorsements that should be bought to fill gaps in the Comprehensive Liability policy coverage.

Now I will discuss specific cases where the policy does not apply. I am continually amazed to find that, although the contract states that certain contingencies are not covered, many contractors assume that they are protected for all contingencies.

It is important to remember that not only under the basic liability policy but also under Contractor's Protective, demolition work done by the prime or his subcontractor is specifically excluded from coverage. When a job involves demo-

lition, whether it is to be performed by you or by a sub, it is important to notify the broker so that proper endorsement to the original policy may be purchased.

Secondly, auto liability is specifically excluded under the provisions of the bodily injury and property damage liability policy.

Another important exclusion, which has resulted in confusion among insurance companies, as well as brokers and contractors, is the so-called "Care, Custody, and Control" clause. Since a liability policy is designed to offer protection against liability actions brought against you by others, the policy does not cover damage to your own property or property over which you exercise "Care,

Custody, and Control." I have yet to hear a good definition of "Care, Custody, and Control." In general, it is intended to exclude claims on work directly performed by the contractor and damaged by the contractor himself. When "Care, Custody, and Control," becomes an issue, I would advise you to consult a good insurance attorney.

Other exclusions specifically affect certain types of work. For instance, if you do pile driving, tunneling, excavations, and similar jobs you are subject to exclusion from the property damage coverages for accidents occurring to property due to 1) blasting or explosion; 2) collapse of buildings or structures due to excavation, tunneling, shoring or underpinning, and 3) damage to underground utilities during the use of mechanical equipment for excavating or drilling. These exclusions, commonly referred to as XCU exclusions, do not apply to bodily injury coverage, but only to property damage.

Expensive Protection

Any or all of these exclusions may be covered with the purchase of an endorsement, but of course the premium increases. In most cases, the cost is substantial. For this reason, if you are considering taking on a new type of construction, you had better remember to add to your bid price the cost of the additional coverage that will be needed.

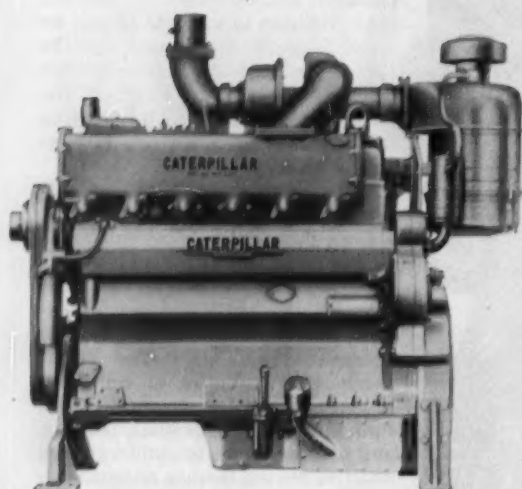
It is imperative that your broker be told if you are planning work that is subject to these exclusions. I can think of cases where a contractor has engaged in this type of work for a short while and failed

(Continued on page 76)

Announcing 2 more new

The new **D337**

Series F with Turbocharger

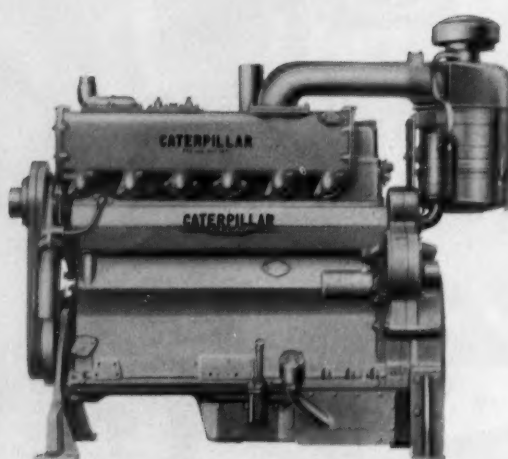


310 HP

maximum @ 2000 r.p.m.

The new **D326**

Series F

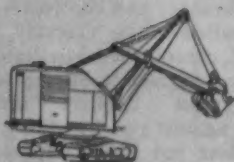


200 HP

maximum @ 2000 r.p.m.

MODERN, COMPACT, HEAVY-DUTY UNITS FOR

Aggregate Dryers
Asphalt Plants
Excavators
Rollers
Compressors
Rock Crushers



Cranes
Ditchers
Dredges
Mixing Plants
Electric Power
Other Construction
Equipment

Available as original power in many types of equipment... direct drive or choice of transmissions, including hydraulic couplings and torque converters. Also available as Electric Sets and Marine Engines.

CAT* DIESEL ENGINES

CHOICE OF 3 STARTING SYSTEMS

AIR ELECTRIC GASOLINE



For fast starts where a supply of compressed air is readily available, a sturdy vane-type air motor is offered. Also available: air compressors and storage equipment.



Where speed of starting and convenience are of greatest importance. Also available: automatic start-stop controls which require no operating personnel.



For all-weather starting. This system preconditions the diesel and supplies full lubrication before the diesel is started. Also available: electric starters for the gasoline starting engine.

Here are the two newest diesels in Caterpillar's modern, heavy-duty line—more efficient, more compact and more powerful than the units they replace. In any application, they offer you more for your money than any engines in their power range!

Major advances in design and time-tested Caterpillar features combine to make this power pair more productive and economical to operate than ever. For example:

- New Turbocharger (in the D337 Series F) utilizes exhaust heat to drive supercharger. Delivers air in direct proportion to engine's need—less air at low load, more air at full load.

- New hydraulic valve lifters practically eliminate valve adjustment and provide quiet operation.

- New, improved water jets deliver fan-shaped flow, provide more effective cooling.

- Heavy-duty, oil-cooled pistons with chrome-faced rings, built for thousands of hours of work before inspection is necessary.

- Sealed cooling system reduces mineral deposits.

- Full-flow filtering of fuel and lubricating oil.

- A complete line of attachments to meet all your requirements.

All these and other features add up to a new standard of performance—better operation and more power with less maintenance and long life. For full details, see your Caterpillar Dealer. You can always count on him for reliable information and prompt service!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

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NEW D337 Series F
and NEW D326 Series F—
LATEST EXAMPLES OF CATERPILLAR
LEADERSHIP IN ACTION

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CATERPILLAR TRACTOR CO., Peoria, Ill., U.S.A.

I'd like more information on the new D337

Series F ☐, D326 Series F ☐.

Name

Address

City Zone State

entirely to consider additional coverage because the operation was only one part of the over-all job and not something he generally performed. When he did this, to all effect he cancelled out the coverage he was carrying, because he was not at all covered for the new operation. If an accident occurred, he would have to assume the loss.

One good reason for purchasing liability insurance under the Comprehensive Liability form is that it includes Contractor's Protective, which protects against your re-

sponsibility for a subcontractor's operations. You should, therefore, be aware that explosion, collapse, and underground damage, while excluded under your basic liability coverage, are not excluded under the Contractor's Protective clause.

Unless you perform directly, as part of your operations, excavation, piling, shoring, or similar work, you can rely on the insurance of the subcontractor who is doing the work. In the event the sub's insurance is faulty, you can rely on your own Contractors' Protective

coverage. This points up another job of the insurance broker. He should be given the opportunity to scrutinize your subcontractor's insurance certificates to make sure that they are adequate.

Contractor's Protective sometimes provides protection for the prime if the sub's insurance is faulty, but there are many instances when the prime's policies and the subcontractor's policies do not overlap. In such cases the prime may be held responsible for the actions of his subcontractors. This again points up the need for a broker to be familiar with all aspects of his client's dealings.

You have probably heard a great deal about the insurance companies' interpretation of "accident" and "occurrence" when a claim arises. It is impossible to give a fool-proof definition of these terms because the courts have handed down many varied and conflicting opinions.

'Occurrence' No Loop-Hole

My experience is that the "occurrence" provision of a liability policy is not the loop-hole it is generally believed to be. To be sure, there are cases where the insurance company may refuse to pay a claim because they rule that damage resulted from "occurrence" and not from "accident." But I have found that if damage occurs on a job where accepted methods are employed and normal safety precautions are taken, the insurance company will honor the claim.

The insurance companies draw a line between "occurrence" and "accident" so that they do not find themselves paying for damages caused by improper construction methods or unsafe techniques. They can not afford to protect a contractor who attempts to save money or do a fast job because he knows he can fall back on the insurance company to cover his losses in the event of an "accident."

In most states it is possible to have the bodily injury portion changed to "occurrence" but it is usually impossible to amend the property damage provision to cover both contingencies. I advise that should the insurance company refuse to pay a claim for property damage you present your case in detail to the insurance company lawyers. If you used accepted methods they will usually honor your claim.

* * *

The third article in this series will appear in the December issue.

Mixing ZERO SLUMP Concrete is "Duck Soup" with this WISCONSIN-POWERED

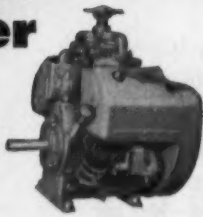


Truck Mixer

Mixing low slump concrete in zero weather is the toughest job you can give a concrete mixer. The concrete resists flow, doesn't slide down the discharge blades readily and puts a terrific load on both the mixer and its power unit. But it's all in a day's work for this 3½-yard, open-end, close-coupled Smith Truck Mixer. It handles the stiffest and stickiest concrete with ease and efficiency in any weather . . . and the Wisconsin Model VF4D Heavy-Duty Air-Cooled Engine supplies adequate power even with a 5-yard load and 0 Slump, according to The T. L. Smith Co., Milwaukee, Wisconsin.

The Wisconsin VF4D Air-Cooled Engine, delivering 25 hp. at 2400 rpm., has the built-in Lugging Power that keeps the job moving through the shock-load pinches without stalling. Heavy-duty features include tapered roller bearings at BOTH ends of the crankshaft, Stellite exhaust valves and valve seat inserts, positive type valve rotators . . . for long engine life and minimum maintenance . . . plus foolproof AIR-COOLING from sub-zero to 140° F.

YOU can't do better than to specify "Wisconsin Power" for your equipment.



This is the Model VF4D Heavy-Duty Air-Cooled Engine that supplies dependable, all-weather power for the 3½-yard Smith Deluxe Truck Mixer.



WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 46, WISCONSIN

OÖLITIC LIMESTONE PREDRAINED AGAIN BY MORETRENCH WELLPOINTS

This is a sewer in Hollywood, Fla., ten to twelve feet deep with water three feet from the surface. Material — Miami Oölite — a soft rock formation.

Several contractors had work on this project. Most thought the use of wellpoints in this material "impossible" — "uneconomical". One contractor, Cleary Bros. Const. Co., of West Palm Beach, decided to try them. Results?

a bone-dry ditch

100' per day progress

no sheeting — no gravel base

innumerable savings

By contrast, average progress on the other contracts was approximately 50' per day.

Does it pay to predrain with MORETRENCH? You bet. Even in oölite!

Ask us how economically you can work "in the dry".

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Canadian Representative: Geo. W. CROTHERS Limited, Toronto, Ontario

GET SET

FOR Big Jobs Ahead

Genuine profit and efficiency gains await the contractor who gets set now for big jobs ahead. Here are a few of them:

More time to compare and analyze equipment more carefully and thoughtfully.

More time to work out financing details without delays.

A chance for your men to become more familiar (and more productive) with new equipment before it goes on tight-schedule jobs.

Opportunity to give new equipment its "shakedown" runs before big, fast-moving jobs begin.

Greater availability of equipment. Greater assurance of getting all front-end equipment you need before the rush starts.

Greater availability of erection men to work closely with your men in assembling and training.

P. S. "Get Set Now" is good advice on your present MARION equipment — review your replacement parts needs — get genuine MARION parts ordered now so you'll really be set for the jobs ahead.

MARION POWER SHOVEL CO. • MARION, OHIO

Gentlemen: Please read literature on sizes of machine checked.

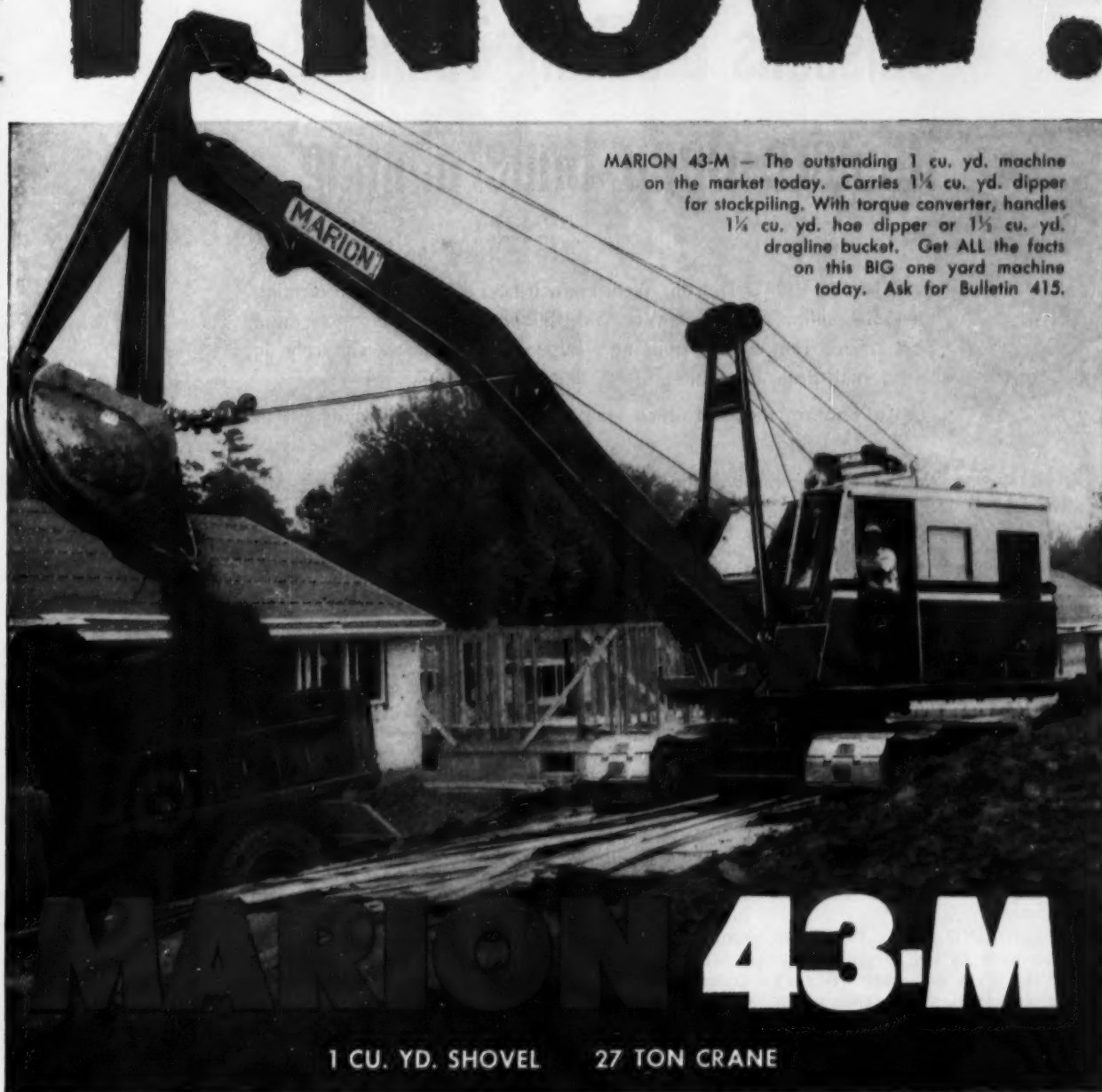
MACHINE	SHOVEL CAP. CU. YD.	SHOVEL BOOM LENGTH (EFF.)	HANDLE LENGTH (OVERALL)	MAX. CRANE BOOM LENGTH	MAX. CRANE RATING IN TONS @ 12' RAD. EXCEPT AS NOTED			HOE CAP. CU. YDS.	ASK FOR BULLETIN NUMBER
MARION 32-M	¾	19'-6"	16'-4"	80'-0"	*17½	*25	*25	¾	416
MARION 43-M	1	22'-6"	16'-4"	100'-0"	*27	*35	—	1-1¼	415
MARION 362	1½	24'-8"	18'-2"	100'-0"	37	—	—	1½-2	398-D
MARION 372	—	—	—	100'-0"	43	—	—	—	—
MARION 83-M	2	24'-8"	18'-2"	120'-0"	60	—	—	2-2¼	414
MARION 87-M	—	—	—	140'-0"	75	—	—	—	—
MARION 93-M	2½	27'-4"	20'-0"	120'-0"	80	—	—	—	397-E
MARION 101-M	3	27'-4"	20'-0"	120'-0"	84	—	—	—	417
MARION 111-M	4	32'-0"	23'-8"	120'-0"	169	—	—	—	402-B

*Rated at 10' Radius in Accordance with General Practice.

THIS COUPON can help you start to get set RIGHT.

NAME _____
 COMPANY _____
 ADDRESS _____
 CITY _____ ZONE _____ STATE _____

T NOW!



MARION 43-M — The outstanding 1 cu. yd. machine on the market today. Carries $1\frac{1}{4}$ cu. yd. dipper for stockpiling. With torque converter, handles $1\frac{1}{4}$ cu. yd. hoe dipper or $1\frac{1}{2}$ cu. yd. dragline bucket. Get ALL the facts on this BIG one yard machine today. Ask for Bulletin 415.

MARION 43-M

1 CU. YD. SHOVEL 27 TON CRANE

MARION / MARION POWER SHOVEL COMPANY
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Besides Heavy Shoring and Concrete Cutting . . .

Caissons Blocking Tunnel Require Deep Underpinning

S. A. HEALY CO. of Detroit, Mich. knew it had a headache in digging the \$3.4 million section of West Side Subway under Chicago's main post office. Ten of the building's huge caissons stood squarely in the tunnel's path. It meant:

- Shoring the post office temporarily to relieve the caissons of their load.
- Cutting through the 10 caissons in the tunnel's path and transmitting their loads to the tunnel's arch.

In the course of the digging Healy was surprised by 16 more caissons whose bells protruded into the tunnel area. That brought a \$1 million "extra" and the biggest headache of all:

- Underpinning the 16 additional caissons 60 ft below the surface and transferring their loads to underlying hardpan.

By **ANDREW BORACCI**
Associate Editor

THE SHORING PROBLEM Healy turned over to his subcontractor, M. J. Boyle Co. of Chicago. Boyle's plan was to build the shores in pairs (see diagram), joining each pair with a cross-member. The next step was to set the shores on either side of the column bolted to the caisson, weld the cross-member to the column, lift the load from the caissons, and transfer it to the ground around the columns.

To do this Boyle digs a 6x12-ft pit 5 ft deep on each side of a column. Into this he puts a pad of 12x12-in. timbers followed by a raft of 3x6-in. maplehearts which serves as a seat for 32 screw jacks, each with a 50-ton capacity.

Still another raft of maplehearts

goes over the jacks. Boyle then builds up a grillage of two 12-in. H-beams and two 21-in. H-beams. Two 36-in. H-beams, to connect the shores, are welded at their centers to the column.

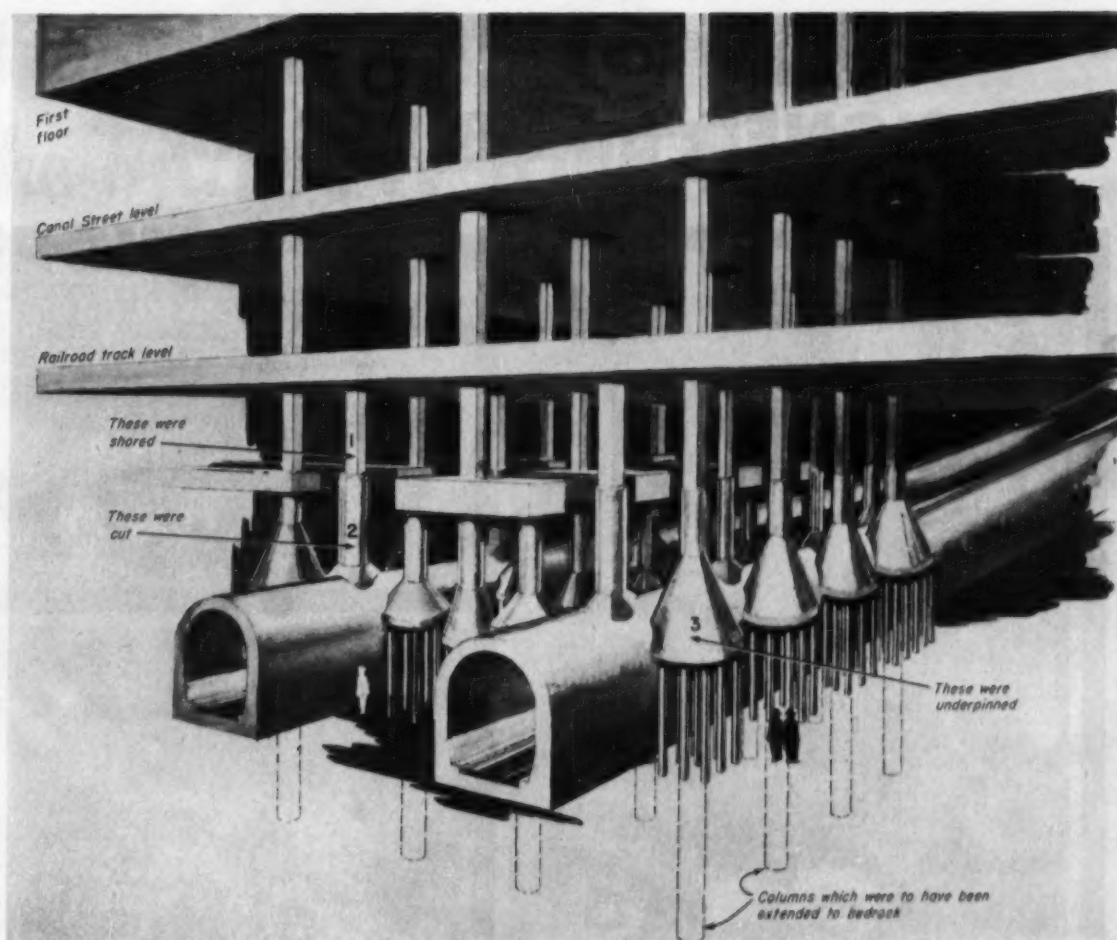
When the caisson is ready for undermining and cutting, two men with crowbars screw up the jacks and transmit the load from the caisson to the bottom of the pit. While cutting and undermining is under way, workmen keep a constant check on the shores for settlement into the pit. Further jacking offsets the settlement.

The caisson loads range from 160 to 200 tons, though each pair of shores is capable of carrying up to 200 tons. Boyle made up 10 pairs but uses only one pair at a time.

Healy's own forces do the mining. Because the tunnel cuts through soft to medium hard clay, which has a high moisture content,

the tunneling is done under 15 psi air pressure. Mining is done by hand until workmen reach one of the obstructing caissons. At that point the most difficult — and dangerous — parts of the work begin: 1) Underpinning the caissons adjacent to the tunnel, and 2) Cutting away the portion of the caisson in the tunnel's path.

Healy subcontracted the underpinning job to Spencer, White & Prentis, Inc. of New York. SW&P's plan, superintended by Vince Leary, was to dig a 3x4-ft pit 6 ft deep beneath the caisson alongside the tunnel, jack a pile down to hardpan 3 ft below tunnel invert level, test it to 50% over the required load, and brace the pile. By digging small pits and jacking the piles one at a time SW&P was able to avoid having to remove any load from the caisson being underpinned.



CAISSONS SUPPORTING 25-yr-old Chicago Post Office are 7½-ft dia. shafts belled to 14-22 ft at bottom. S. A. Healy Co.'s contract was to shore columns 1) to remove load from caissons 2) blocking

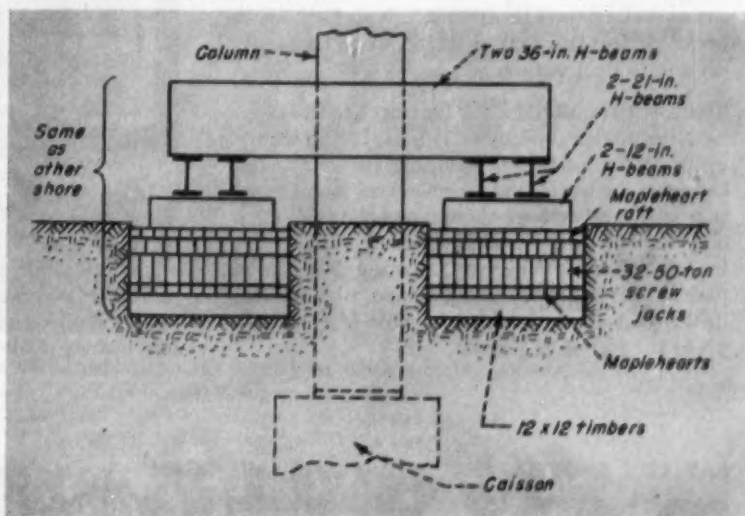
tunnel so that caissons could be cut. Discovery of belled caissons 3), where shafts extending to rock were expected, required cutting portions touching tunnel and underpinning the remaining bell section.

Jacking the Piles

Once Leary's men have mined a drift beneath the caissons they begin jacking. SW&P uses sections of 16-in. dia pipe (⅝-in. wall thickness) 4 to 5 ft long. Sleeves 5/16 in. thick act as connectors between lengths of pipe.

Workmen place the first pipe section and set a 2-in. steel plate 18 in. square over its head. On top of that they set two hydraulic 75-ton jacks which extend up to the caisson bottom. Here they are braced against a second steel plate, dry packed to the concrete. Then, reacting against the caissons, the jacks thrust the pipe into the ground.

Hand-operated pancake augers and post-hole diggers muck out the clay in the pipe before another section is added. Each tool is fitted on its shaft with a universal joint
(Continued on page 84)



TWO SHORES JOINED BY BEAM welded to column enable contractor to transfer load from caissons being undermined to ground on either side of column. Though easily built up, shores working in pairs can transfer up to 200 tons. Jacks are operated by hand.

...not just a conversion

DESIGNED and BUILT for

CRANE WORK

...there is a difference



Yes, there is a difference in whether your crane is designed and built for crane work or is just a change in booms. The difference is spelled out in better performance on all crane work from pile driving to steel setting.

The BAY CITY MODEL 450 Erectors Crane, shown here, has a rated capacity of 15 tons . . . will handle up to 75 feet of boom, including jib . . . has an independent worm and worm wheel boom hoist that will raise or lower boom, or boom and load, only under power through separate clutches . . . has a collapsible hi-gantry, floating bridle and pendant cable boom tension system, plus tandem drums with the hoist drum capable of wrapping up to 862 feet of $\frac{3}{8}$ " cable.



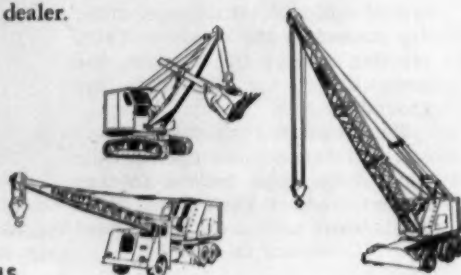
These are but a handful of the bigger values built into the BAY CITY Erectors Crane. Before buying your next crane, it will pay you to look into the time-saving, money-saving possibilities of a BAY CITY. Write for complete information or see our nearest dealer.

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What holds up the **TALLEST TV TOWER** in Texas?

NEW 1,521-FOOT
TOWER FOR
STATIONS
WFAA-TV
AND
KRLD-TV
DALLAS, TEXAS

**38,682 ft. of
AMERICAN
TIGER BRAND
GUY LINES**

High in the sky of Texas, the new Dallas TV tower has taken its place among the world's tallest man-made structures. It is 1,521 feet high . . . topping the Empire State Building by 49 feet. What's more, it supports not one, but two 82-foot TV antennas, with provision for a third.

To make it tough for designers, the tower had to withstand Texas wind velocities up to 155 miles per hour. This problem was solved by bracing the tower with 30 Tiger Brand galvanized guy lines ranging in size from 1 3/8" to 2" in diameter. These are anchored in concrete as far as 1050 feet from the tower. The larger guy lines are designed to withstand pulling stresses up to 245 tons.

Wherever you need strong, tough guys, that will stay that way for years — specify USS American Tiger Brand.

Designed and Fabricated by
Dresser-Ideco Company,
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Erected by
Beasley Construction Co.,
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AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL, GENERAL OFFICES: CLEVELAND, OHIO
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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS AMERICAN TIGER BRAND WIRE ROPE

Excellently Preformed

UNITED STATES STEEL





CAISSONS BLOCKING TUNNEL'S PATH are shown fully braced and ready to be cut away. Longitudinal needle beams, welded to special plate on the haunch ribs, are removed before tunnel arch is concreted. Caissons adjacent to tunnel had to be underpinned.



PILES ARE PRE-TESTED by the placing of two jacks between caisson and pile top. Jacks exert 50% overload that is left for 2 hr.

to ease handling in limited work space.

Further sections of pipe are added and jacked until the pile tip reaches hardpan 18 to 20 ft below

the caisson. Up to 20 ft of pile are sunk per 8-hr shift. An electric mixer makes up a batch of 3,000-lb concrete which is poured into the pipe. The piles then are ready for testing.

Pre-testing the Piles

Pre-testing simply means applying a pre-determined load to the concreted pile until its settling stops, then, while the load is maintained, placing a wedge between the pile top and the caisson it is to help support before removing the testing device.

Workmen place jacks and steel plates between the pile and the caisson bottom and thrust the pile into the hardpan until a 150-ton load is created without settlement.

When the load finally holds, the distance between the pile and caisson is measured. The load then is left for 2 hr. Another measurement shows whether there has been any further settlement.

(Text continues on page 89)



STUB COLUMN IS WEDGED between caisson and pile top, then jacks are removed. Workmen then move on to next pile.



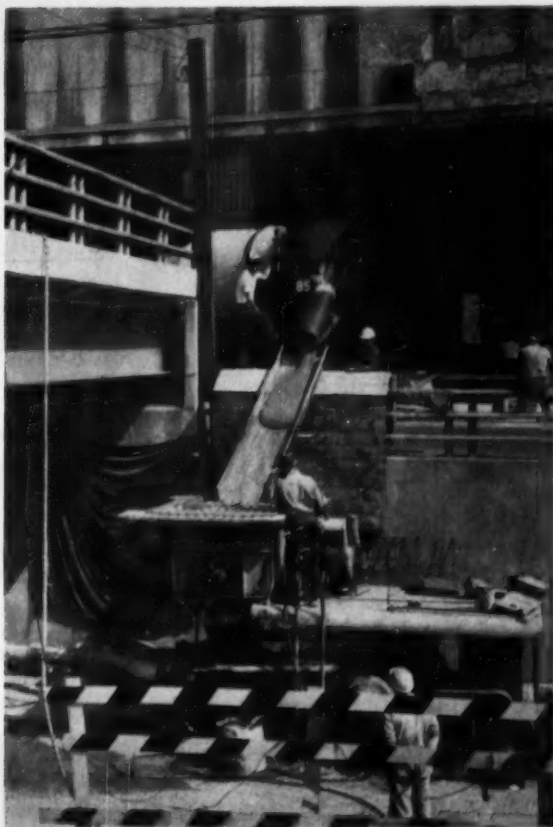
DRIFTS ARE MINED in one-pile sections to avoid removing load from caisson. As each section is underpinned, new section is mined.



PIPES ARE JACKED in 4 to 5-ft sections. Two 75-ton hydraulic jacks, reacting against caisson bottom, thrust pipe into ground.



PIPES ARE MUCKED by hand. Pancake augers and post-diggers, fitted with universal joints ease handling in limited space.



JACKING PIT IS PUMPCRETED full of concrete once all piles underpinning caisson have been completed. Concrete is transit-mix fed to Rex 200 Pumpcrete machine which pumps it 600 ft to jacking pit.



CORRIDOR IS MINED alongside of blocking caisson so that bracing can be placed up to and around it. Load has not yet been removed from the caisson and will not be until tunnel section is braced.

NEW INTERNATIONAL®



New International 300 Utility tractor with backhoe and loader combination, excavated and backfilled 800 yards of shale-type clay on 32,390 sq. ft. office and warehouse in Shreveport,

La. Weight and balance of this new heavy-duty tractor adds greatly to stability when using heavy rear and/or front-mounted equipment.

DO MORE WORK WITH AN INTERNATIONAL 300



The rugged Model 300 tractor is ideal for special-duty equipment of all types. Here you see it powering a backhoe—a versatile digging machine for utility trenches, footings, septic tank installations, culverts, etc.



The Hydra-Touch control and fast-hitch arrangement on the Model 300 make it easy to attach rear-mounted equipment such as this versatile leveling blade, which is often profitably combined with a front-end loader.



The low center of gravity, adjustable front and rear wheel tread, comfortable seat and all-around visibility of the Model 300 make it outstanding as a mowing tractor. Here you see it equipped with a hydraulic mower.



INTERNATIONAL INDUSTRIAL POWER

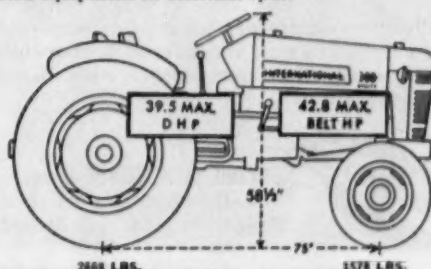
300 UTILITY TRACTOR

10 speeds forward with exclusive Torque Amplifier Drive...change speed, boost pull-power up to 45% ON-THE-GO!

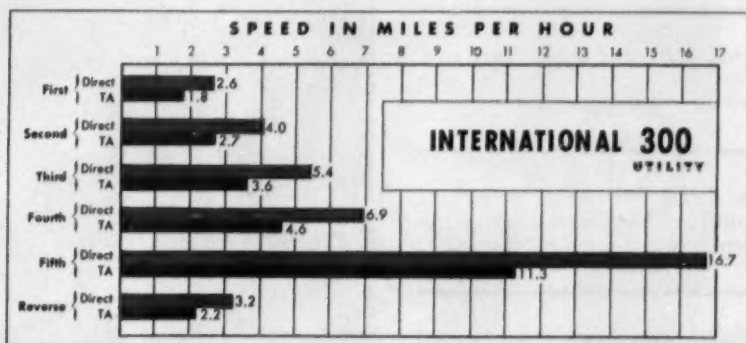
Here's a new utility tractor that outperforms anything you've seen up to now. It has more *built-in* weight to deliver traction where lighter weight utility tractors slip or stall. Every pound is working weight—more powerful engine, stronger chassis, more rugged power train and axles, with power-weight balance to step up pull and push power. It's *all* tractor, built with characteristic IH stamina to stay on the job over the long pull!

The husky tractor delivers 39.5 maximum drawbar horsepower by official test—produces 4,379 pounds pull in low gear at part throttle. The new 300 is available in more ways and with more exclusive features than other tractors of its type. For example, it's available with a standard 5-speed transmission or you can also have it with optional Torque Amplifier drive which gives you 10 speeds forward—from 1.8 to 16.7 mph—and 2 reverse. In any gear, you can change speed and boost pull-power without touching the clutch, the throttle, or shifting gears! *Power is delivered to the rear wheels without interruption while*

changing tractor speed. With TA and independent power take-off, you can change travel speed while keeping power-operated equipment at constant rpm.



Unmatched traction and stability! Drawing shows power-weight balance of bare tractor—up to 1,000 pounds more built-in weight, with center of gravity only 25 1/2 inches from the ground.



10 speeds forward, 2 reverse with IH Torque Amplifier*. Operator can increase or decrease speed, and boost pull-power up to 45 per cent *on the go* without declutching and shifting

gears. He merely pulls back the lever (shown in the photo above) for instant boost in pull...pushes it forward to resume full speed on the go. *Optional equipment

Sales and Service near your job... ANYWHERE... from the world's largest network of International Industrial Power distributors and dealers. Look in the classified... phone for an on-the-job demonstration. There's a *complete* line of McCormick and special-duty equipment to give the new International 300 utility *unlimited!* For illustrated folder, write International Harvester Co., Chicago 1, Illinois.



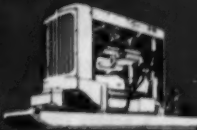
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Power Shovels



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Power Units



Industrial Wheel Tractors

ARMCO STEEL SHEETING SIMPLIFIES CONSTRUCTION JOBS

Practically every construction job involves some problem in controlling the movement of soil or water. And many of them can be solved—easily, quickly and economically—with Armco Steel Sheeting. Here are the advantages you get with the reasons for them.



STRONG, LIGHTWEIGHT Because Armco Sheeting combines the advantages of durable metal and corrugated design you get a high strength/weight ratio.



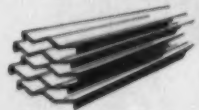
EASY TO HANDLE Because of its light weight, one man can easily carry and handle a section of Armco Sheeting. And they nest compactly in storage.



EASY TO DRIVE Because of its small displacement area, it's usually possible to drive Armco Sheeting with hand maul or small driving equipment.

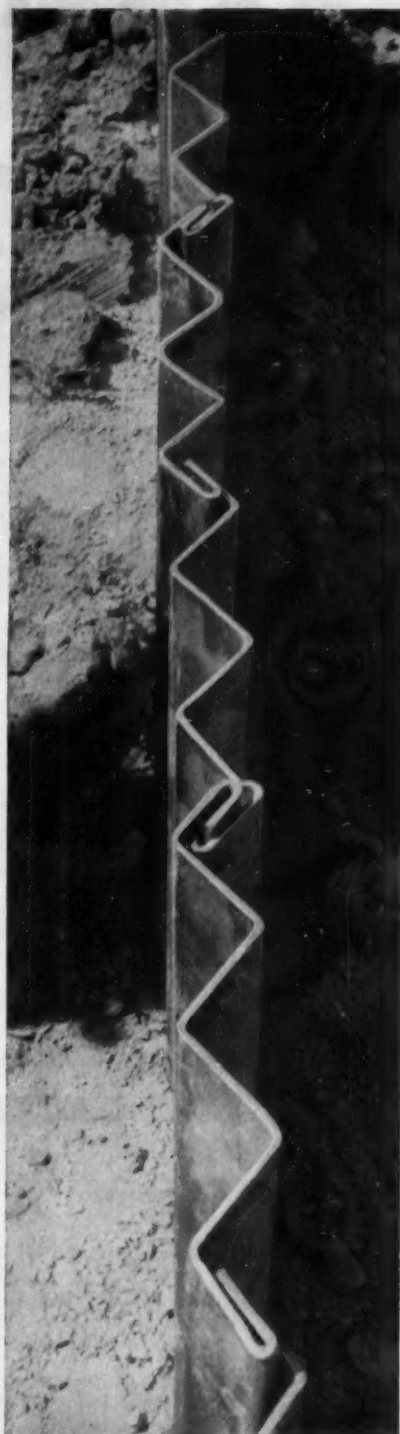


SALVABLE Because Armco Sheeting is strong and straight, it can be used again and again as a construction tool. Convenient hole makes pulling easy.



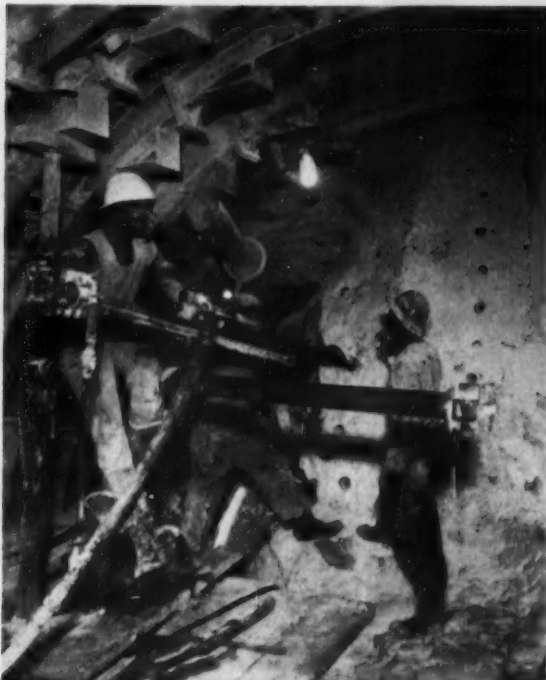
ECONOMICAL Because Armco Sheeting can be used over and over in all types of temporary jobs, unit costs drop lower with each re-use.

There are two types of Armco Sheeting: Interlocking and Flange. Principal difference is that Interlocking is used where practical watertightness is required. Both are supplied in a range of gages and in lengths up to 20 feet. Write for data. Armco Drainage & Metal Products, Inc., 4935 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corporation.



ARMCO STEEL SHEETING

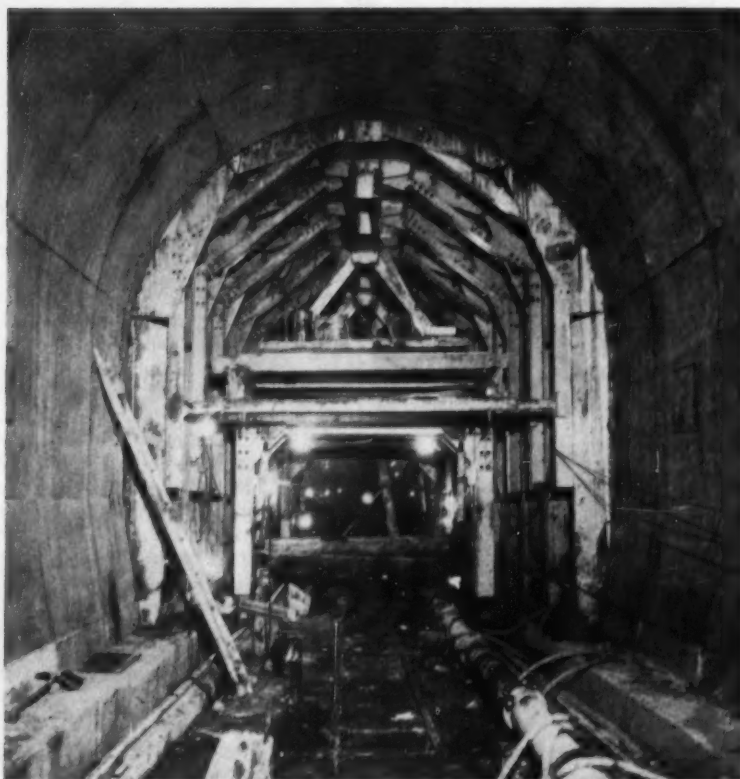
Manufacturers of: MULTI-PLATE Pipe, Arch and Pipe-Arch • Corrugated Metal Pipe • Welded Steel Pipe • FLEX-BEAM Guardrail • Water Control Gates • Retaining Walls • Steel Buildings • Sheeting • Bridge Plank • Tunnel Liner • Subdrainage Pipe • End Sections • Pipe Piling and Pile Shells



CAISSON IS DRILLED with 3-in. Joy drifter drill, and concrete then is broken up by Duncan hydraulic Roc-Jaks put into the holes and expanded. Caisson is relieved of load before being broken up.



REINFORCING RODS AND FORMS are placed under remaining portion of the cut caisson and the arch quickly Pumpcreted. Arch is concreted first just in the sections around the cut caisson.



COMPLETED TUNNEL SECTION under caisson gets up to a three weeks' curing before steel Blaw-Knox forms mounted on travelers are removed. Mining, meanwhile, has begun towards next caisson blocking tunnel where complete cutting operation will be repeated.

Once Leary is satisfied that the pile has settled fully, he places a stub column between the jacks. This column fits as closely as possible between caisson bottom and pile top. Workmen hammer $\frac{1}{2}$ x2x14-in. wrought steel wedges between stub column and plate to insure a snug fit and to prevent any rebound of the piles when the jacks are removed.

When the piles beneath the caisson have been jacked, pre-tested and secured, the jacking pit is pumped full of concrete. The caisson bells get an average of 10 piles each. When the 16 caissons have been underpinned in this way, Healy cuts off the portions of the underpinned caissons protruding into the tunnel walls.

Cutting the Caissons

Healy drills a close pattern of 3-in. dia holes into the concrete with Joy stopers. Duncan hydraulic Roc-Jaks next are inserted into the holes and expanded, causing the concrete to break up in chunks between the holes.

The same method is used to cut the caisson bells blocking the tunnel's progress. Before cutting begins, however, the tunnelers brace up as close as possible to the cais-



To help you hole - thru faster...

COMMERCIAL liner plates speed up mining in soft ground tunneling

Working many feet underground in the heading of a soft ground tunnel, this crew is unconcerned about the possible danger which could result from a cave-in. By installing the COMMERCIAL steel liner plate system of ground support, the contractor of this job is providing the best safety insurance for his men as well as assurance for himself that his job can be completed on schedule.

When you realize that the COMMERCIAL plates have continuous inward flanges with all four corners solid, it is easy to understand why they are so strong and will support such heavy loads. No one wants to take a chance of losing a heading because of inadequate ground support. A lost heading, like a lost week-end, costs money and takes time to recover from.

Look how close to pay line these "sand hogs" mine. Just a few more spadefuls of dirt need to be removed before one of them will slap the next plate into place while the other will

slip seven bolts thru matching holes in the flanges and quickly tighten up the nuts with a ratchet. Bolt in one hand, nut in the other, two inside vertical flanges between with matching holes—everything out in the open—what could be quicker or more simple?

As all flange joints are butt to butt and plates are curved to the exact required radius, there's no over-mining beyond pay line to cause voids behind the plates. Thus ground ravelling is minimized and reduction of the amount of grouting behind the steel lining, if any, becomes a very substantial cost-saving item.

Our experience, from many years work with engineers and contractors who have successfully used the COMMERCIAL liner plate system in hundreds of different soft ground tunnels, can be a great help to give you the footage and safety needed to complete your tunnel on schedule. There will be no obligation.



THE COMMERCIAL SHEARING AND STAMPING COMPANY
Youngstown, Ohio - Chicago, Illinois - Salt Lake City, Utah

CAISSONS BLOCK TUNNEL . . .

Continued

son with 8-in., 35-lb WF beams and steel liner plates.

Crews then hand-mine drifts on either side of the bell, placing additional haunch ribs as they proceed. The haunches are supported by a 30-ft 10-in. needle beam held up on each end by jacks resting on the tunnel's wall plates. The needles are welded to plates provided on the haunch ribs. Workmen then mine and brace behind the bell as they did in front. The tunnel area around the caisson, at this stage, is fully plated, ribbed and braced except for the portion through which the bell protrudes. At this point the shores set in the sub-basement are jacked to remove the load from the caisson. The bell then is stoper drilled and broken up with Roc-Jaks.

Once the bell has been cut away flush with the tunnel's arch, additional crown ribs and liner plates are placed, and forms and reinforcing set. The arch is Pumpcreted, then the remainder of the tube is formed and Pumpcreted. The concrete gets a 2-week curing before the shores on the sub-basement level are removed and the caisson's load transferred to the tunnel arch.

On to Next Caisson

Healy goes back to his regular mining procedure until the next caisson is reached. The contractor first mines a drift. Steel liner plates are placed back of 8-in., 32-lb wall beams and 6-in., 20-lb haunch ribs 2 ft 6 in. on center, which brace the tunnel's walls and overhead.

Healy then Pumpcretes the tunnel's invert. The concrete comes by pipe from a gas-powered Rex 200-Double Pumpcrete machine which is transit-mix fed at the tunnel's mouth, 600 ft away. When invert and slab are poured, Healy rolls a prefabricated section of steel Blaw-Knox forms set on travelers into place and tie-welds them to the bracing. Reinforcing follows and the section is poured.

The West Side Subway consists of two 2,100-ft concrete tubes, 22 ft in dia and spaced 36 ft apart. The new section, when completed in late 1956, will connect with the existing Dearborn St. Subway. John Salmon is Healy's general superintendent on the job. Ernest Jelinek is the resident engineer for the city. Dick Van Gorp is chief engineer for Chicago's Dept. of Public Works.

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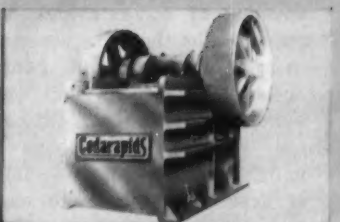
Single Pass Plants for low-cost crushing units where material does not have to be accurately graded, and for jobs where portability and fast set-up are important.



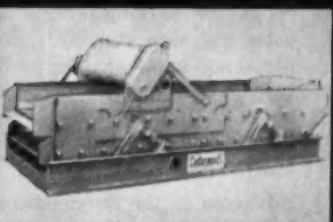
Hammermill Secondary Plant, a complete gravel crushing and screening plant, produces roadrock or aglime or a percentage of both at the same time.



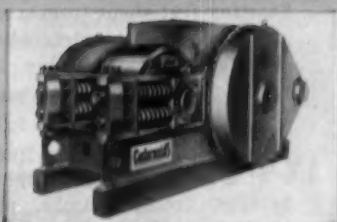
Portable Double Impeller Impact Breakers are ideal primary units for use ahead of secondary crushing plants. Use alone for high capacities of desirable cubical shaped aggregate.



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World's Longest Highway Bridge Is Prestressed Concrete. The roadway of the Greater New Orleans Expressway crossing Lake Pontchartrain is being laid with concrete slabs 56 feet long and 33 feet wide precast with curb and gutters and prestressed with 175 separate Tufwire Strands.

Engineers See Tremendous Future for Prestressed Concrete as Present Uses Multiply at Fast Pace

The use of prestressed concrete in scores of structures from parking lot curbs to giant bridges and warehouses is increasing at a tremendous rate. Starting just about from scratch a few years ago, prestressed concrete construction during 1955 totaled up to millions of square feet.

Prestressed concrete is finding a wide range of uses in highway bridges, trestles, docks, piers, highways, airport runways, shopping center facilities, schools, gymnasiums, stadiums

and a rapidly growing list of residential, commercial and industrial buildings. A look at the "small item" end of the list turns up such products as movable curbs for parking areas, light poles and sign standards, fence posts, and many another product to suggest the field of uses is about as unlimited as the imagination of engineers and business men.

Advances in the development of better high tensile strand and wire for tensioning the concrete are in large part responsible for

this trend to prestressed construction. Architects and engineers have known for a long time they could apply this principle and save substantial amounts of concrete and steel required for the same structure in reinforced concrete. Longer spans, less deadweight, and lighter foundations were some of the specific benefits to be gained. As soon as the problem of dependable tensioning materials was whipped, the way was opened wide to the present boom in prestressed construction.

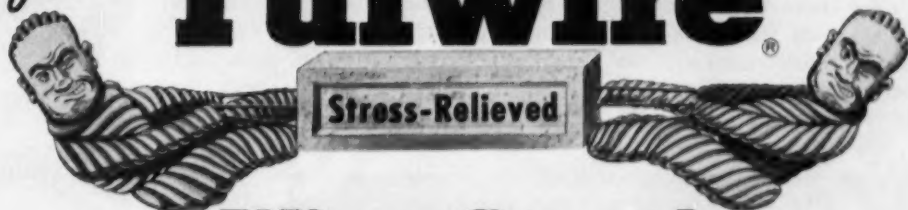
The research and production facilities of Union Wire Rope Corporation have been geared to the seven-league strides of prestressed construction since the trend began shaping up some ten years ago. Our expanding plant capacity and central location in Mid-America have made us the ideal source of supply for the strand and wire that form the "tendons" of prestressed concrete.

Prestressing offers opportunities not only to large-scale contractor and constructor, but also to the fabricator of smaller concrete products of every description. The owner of even the smallest business of this latter nature may have much to gain in letting us help him explore the possibilities of prestressing in his product. We'll welcome the invitation.

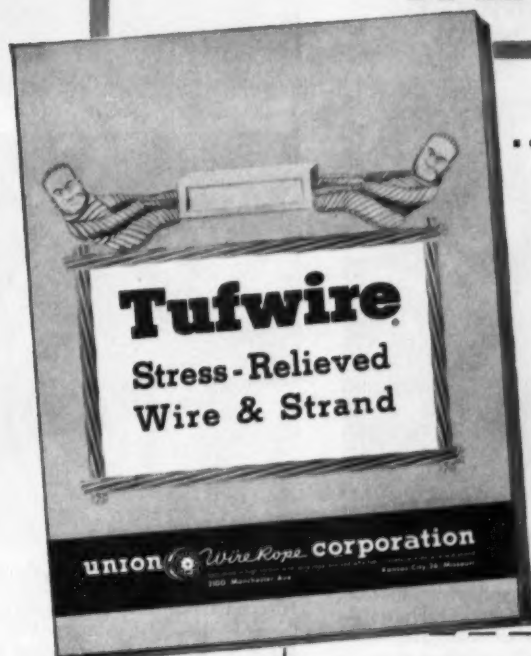
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The jobs don't come too big or too small for on-schedule supply of Union Tufwire (Wire or Strand) — whether it's for the world's longest highway bridge (pictured above) or a one-story building. Even though the demand for Tufwire has taken mighty big strides ahead, we stay ahead of present demand, and we're geared for the future.

What's more, we place at your service the foremost staff of engineers and technicians, and the most advanced research laboratory in the industry. We have the know-how for the big jobs and sincere interest in the smallest ones. Call on us for counsel.

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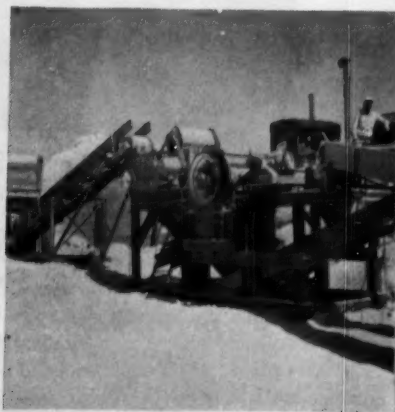
13 TD-24's for Nello Teer—Most of the tractor work on their 4.98-mile, 3,065,090-yd. \$4,306,000 section of the Massachusetts Turnpike is being done by these 161 dhp crawlers. Four with

scrapers combine to average 327 twenty-yard loads daily on 1500 ft one-way hauls. Others tow rippers, push-load scrapers, or clean up around Teer's two 2½ and 4-yd shovels and 10 haulers.



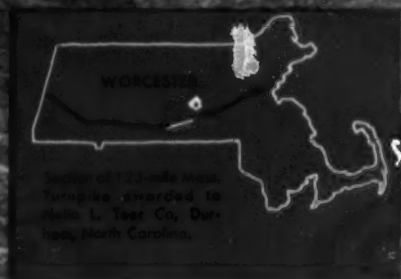
"1/3 more overburden daily than competitive crawlers" ... that's the report from Merkli Brothers Coal Company, Beaver, West Virginia, on their International TD-24. Unit is stripping 40 feet of sandstone and

shale to uncover a 12 to 51-inch coal seam. "It has better balance and visibility than other tractors," says Partner Henry L. Merkli. "It costs less to maintain; takes less time to grease, too."



Crushes gypsum—Near Avenal, Calif., Superior Gypsum Company's International-powered crusher produces 300 tons of gypsum per 8-hr. day. Material is used to neutralize high-alkali irrigation water.

1 more trip hourly—Fast loading and acceleration help 18½-yd. Payscraper make one more trip hourly than other self-propelled scrapers used by W. E. O'Neill Construction Company, Gary, on their 2½-mile, 700,000-yard Indiana Turnpike section near Gary. Cycle length averages 2½ miles; material is mostly sand.



80 ft ditch in 3 hours—Excavating for water main in Henderson, Texas, International "300" wheel tractor dug 100 cu yds of clay hourly. Backfilling was handled by rig's front-end loader. Ditch is 4 ft deep, 22 in. wide.



"We saved 100 man-hours by lifting zonolite roofing slabs with our International-Drott TD-6," reports M. G. Aldrich, Macon, Georgia, on the 13,000 sq ft building job shown. Lifts of 1 ton were made to 10 ft eave height.



Rugged in rugged rock—"TD-6 is ideal for opening underground mines," says Malcolm McDonald of Kiabob Uranium Corp, Green River, Utah, "It gets around fast in narrow tunnels, yet brings out big loads."

International



Industrial Power

A machine size for every job... see your nearest INTERNATIONAL DISTRIBUTOR for details.



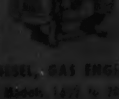
WATER PUMPS



WHEEL TRACTORS



CRAWLER TRACTORS



DIESEL GAS ENGINES

Also International Drag High-Wheeler, International Scrapers, Bottom-Dump Wagons and International Superior Pipe-Beam Tractors

With air delivery ratings over 100 cfm at 100 psi

With air delivery ratings over 100 cfm at 100 psi

PORTABLE AIR COMPRESSORS-1955

With air delivery ratings over 100 cfm at 100 psi

Specs for Your Files...

[illegible]

There's only one **GYRO-FLO**

Ingersoll-Rand's Portable Rotary Compressor

INTRODUCED IN 1950

In 1950 the Gyro-Flo was absolutely new—a bold, forward, original idea in portable compressors. There was no other portable compressor like it.

Now, years of successful performance of thousands of units in all four sizes has established GYRO-FLO as the standard in portable compressors. This is affirmed by the ever-growing trend to rotary design.

Here there is no substitute for experience. Maintenance costs cannot be measured by one year's operation—or even two or three years'.

Each size must pass the test of time on the job. That's what GYRO-FLO has been doing since 1950. During this time all new, necessary features have been added so that GYRO-FLO is the best established rotary portable compressor now available.

When you purchase GYRO-FLO air power, you get today's most economical portable compressor. There is only one GYRO-FLO—and Ingersoll-Rand has made it since 1950.

Ingersoll-Rand, 11 Broadway, New York 4, New York



AVAILABLE IN FOUR SIZES

125 *cfm*
210 *cfm*
315 *cfm*
600 *cfm*



2-294



Wire Rope at Work—This is part of the steelwork for a brand-new building on New York's East Side. It will be a beautiful multicolored structure topped by a striking blue tower. When completed, the building is to be known as 711 Third Avenue. "711" will usher in an era. It is expected to pioneer an exciting period of new construction on Third Avenue—a development forecast by the razing of the elevated railway.

As the steelwork for 711 went up, Bethlehem wire rope was much in evidence. You see some of it in the photograph: that hoist line, for instance, descending from the derrick boom. The rope was Purple Strand, of course, Bethlehem's toughest grade, and it handled those heavy structural members as if they were straws. A typical assignment for Purple Strand, one duplicated many times a year in every part of the country.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem rope for the following industries and numerous others:

CONSTRUCTION • MINING • PETROLEUM • EXCAVATING • QUARRYING • LOGGING • MANUFACTURING



GOOD MAINTENANCE TIP: Check Industrial Hose

INDUSTRIAL RUBBER HOSE is necessary and costly. Periodic care and checking will enable users to get longer hose life and better performance. The Thermoid Co., Trenton, N. J., offers these suggestions to prevent hose abuse:

1. Materials carried should influence selection of type. For example, where hose conveys any type of petroleum product, the tube should be compounded to resist attack by oil, grease or gasoline. There are special types for paint, dilute acids and solids.

2. Hose size is important. The inside diameter must be adequate to do the job. Too small a hose means excessive pressures and usually not enough capacity. Too large a hose increases costs, creates irregular flow.

3. Pressure requirements should be studied. Can pressures be reduced so that more economical hose can be used? Is pressure constant? Is it negative or positive? Suction hose requires a spiral or ring-type reinforcement.

4. Temperatures must be watched. High temperatures require special hoses, and the same hose should not be subject to both hot and cold materials.

5. If solids are carried, what are their relative size and abrasiveness? And, if solids are carried in a corrosive liquid, the tube must be compounded to resist attack.

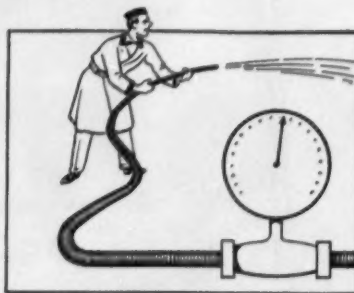
6. Observe bending radius limits of hose. As a general guide, radius is approximately 1 ft. for every inch of inside diameter. Hang in large loops over saddle-type supports—not small supports, such as nails.

7. Be moderate in length. Hose must be long enough to prevent stretching, but too much runs up the cost and encourages snags and kinks.

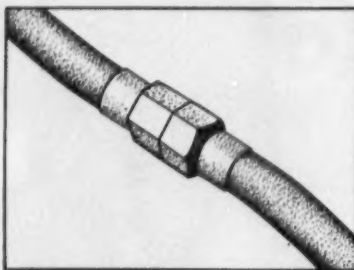
8. Twisting tends to separate reinforcing material, may weaken the structure, is most critical in short hose lengths.

9. Cycles of operation affect hose life. Is it in constant even-going use, or are there periods of rough use and periods of idleness? Is it left in the sun for long periods? Is it dragged from place to place?

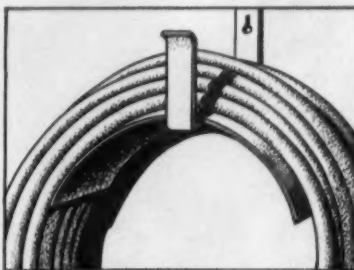
DO's ...



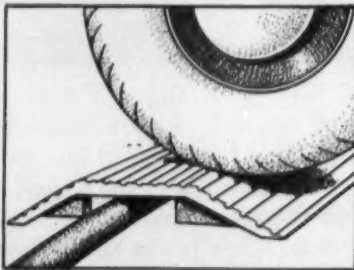
Always select proper diameter hose



Use correct couplings for the job



Hang hose over saddle-type supports



Provide hose guards when necessary

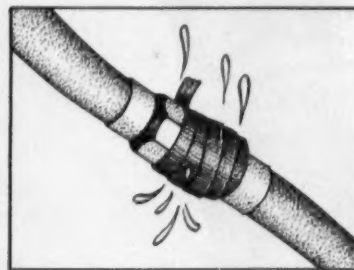
Hose should be bought to meet known conditions and stored carefully indoors when out of service. Quick disconnects will eliminate some forms of rough handling.

10. Correct couplings, properly installed and maintained, are an-

DON'Ts ...



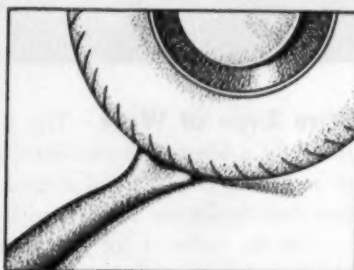
Wrong hose size reduces efficiency



Don't substitute or improvise



Don't hang hose on nails or hooks



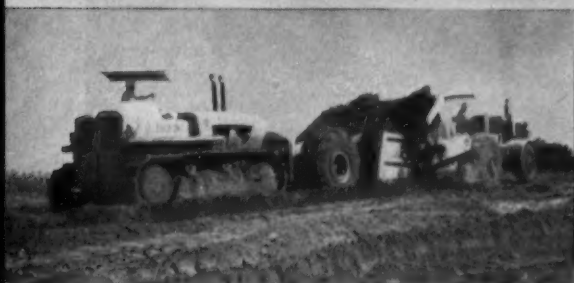
Don't allow hose to be damaged

other check point to achieve greater economy. Here is a source of leaks.

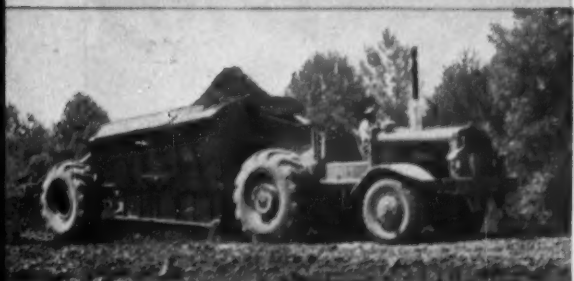
11. Accidental damage takes a great toll on hose. Protect it against falling rock, vehicle crossings and contact with sharp and heavy tools.



An S-18 scraper spreads 21 yds. of clay on the fill. With 300 h.p. engine and Torqmatic Drive this "Euc" has plenty of power for fast loading, hauling and spreading even in the toughest going.



A total of 688 h.p. at work here! Two 194 h.p. engines in the Euclid TC-12 Crawler and 300 h.p. in the "Euc" Scraper made short work of getting heaped loads of sand in a hurry.



Dumping their big loads on the fly, Bottom-Dump "Eucs" made fast cycle time from borrow pit to fill and back again. They were loaded by 2 1/2 yd. draglines and a Euclid Loader.

49 "EUCS"

on Heavy Road Grading Job

Contractors who know their earth moving equipment use "Eucs" on the tough, rush jobs. They know from experience that they can rely on Euclids to get more work done at the lowest cost per yard . . . and keep doing it month after month.

This 6.3 mile road project in Illinois is a typical example. S. J. Groves & Sons Co., J. C. O'Connor & Sons Co. and Potashnick Construction Inc. put 49 "Eucs" to work on a total of 2,238,171 cu. yds. of earth excavation. Grading operations started the middle of July and were completed the end of September. These contractors used 24 Euclid Scrapers, 23 Bottom-Dumps, a "Euc" Loader and a new TC-12 Twin-Power Crawler. . . 47 out of 68 hauling units on the project were "Eucs"!

Hauls from borrow pit to fill ran as high as 4500' and averaged about 3000'. Daily production was around 50,000 yds. Fills of 22' to 36' were necessary to raise the road above high water level of the Wabash and Little Wabash Rivers during flood periods. Operating personnel on this job — with the biggest fleet of earth moving equipment ever used on an Illinois road project — say that "Euc" performance played the major part in completing the earth moving in such fast time.

It's performance like this that makes "Eucs" important to the profit picture on hundreds of construction jobs . . . a good reason why **EUCLIDS are your best investment.**

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio



Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE



TEN MILLION TONS OF ROCK QUARRIED OUT OF MOUNTAIN TO BUILD CANADIAN CAUSEWAY



With the completion in only twenty-eight months of the three-quarters of a mile Canso Causeway, the Nova Scotia mainland and Cape Breton Island now have a new and vital link. Before its existence, all surface traffic over the Canso Straits went by ferry. Now, on a massive, dumped bed of rock quarried with the help of Atlas Copco rock drills, Sandvik Coromant Drill Steels and other equipment, a railroad track and highway have been laid, enabling trains, automobiles, and trucks to make their own way across the Canso Straits.

WORLD'S DEEPEST CAUSEWAY

Though the Canso Causeway is quite short in length, it has the distinction of being the world's deepest with a maximum depth of 210 ft. At this point, rock at the bottom of the bed had to be spread over 800 ft. Altogether, rock was required for a distance of 4,300 ft. across the Straits and for 2,700 ft. along the shore. In helping to block the great depth of the Canso Straits, Atlas Copco rock drills, Sandvik Coromant Drill Steels and other equipment, were used in one of the biggest rock-moving jobs ever undertaken in Canada.



98 TUNNELS DRILLED

By the time the Causeway had been completed, 10 million tons of rock were blasted for its construction out of the side of Porcupine Mountain on the mainland. To do this, the contractors, the Northern Construction Company and J. W. Stewart Limited, decided on the coyote-hole method of quarrying. This entails driving small tunnels, loading them

with dynamite and then blasting. On Porcupine Mountain, ninety-eight such tunnels were drilled, each 3.5 feet high, 5.5 feet wide and 5 feet deep.

ONLY 8 ROCK DRILLS AT WORK

The ninety-eight tunnels eventually involved 18,000 feet of tunnelling. For this work the contractors employed a very small drilling force consisting of only eight rock drills. Of these, seven were Atlas Copco light rock drills. They were fitted with Sandvik Coromant tungsten-carbide-tipped drill steels. All this equipment was supplied by Canadian Copco Limited.

SMOOTH QUARRYING PROGRESS

Even using the coyote-hole method, eight rock drills are not many when it comes to quarrying 10 million tons of rock. Yet these few rock drills were able to keep 180 men and a fleet of mechanical shovels and dumping trucks continually active clearing broken rock. Atlas Copco light rock drills fitted with Sandvik Coromant tungsten-carbide-tipped drill steels are a unique drilling combination. The obviously smooth way in which quarrying operations were carried out on Porcupine Mountain is typical of the results this drilling combination is bringing to construction projects all over the world.

Atlas Copco Compressed Air Equipment is manufactured or sold and serviced in 48 countries throughout the world by the *Atlas Copco Group*, which embraces companies trading under various names such as Atlas, Atlas Diesel, Atlas Polar, Atlas Copco, Copco, Delfos and Sampa.

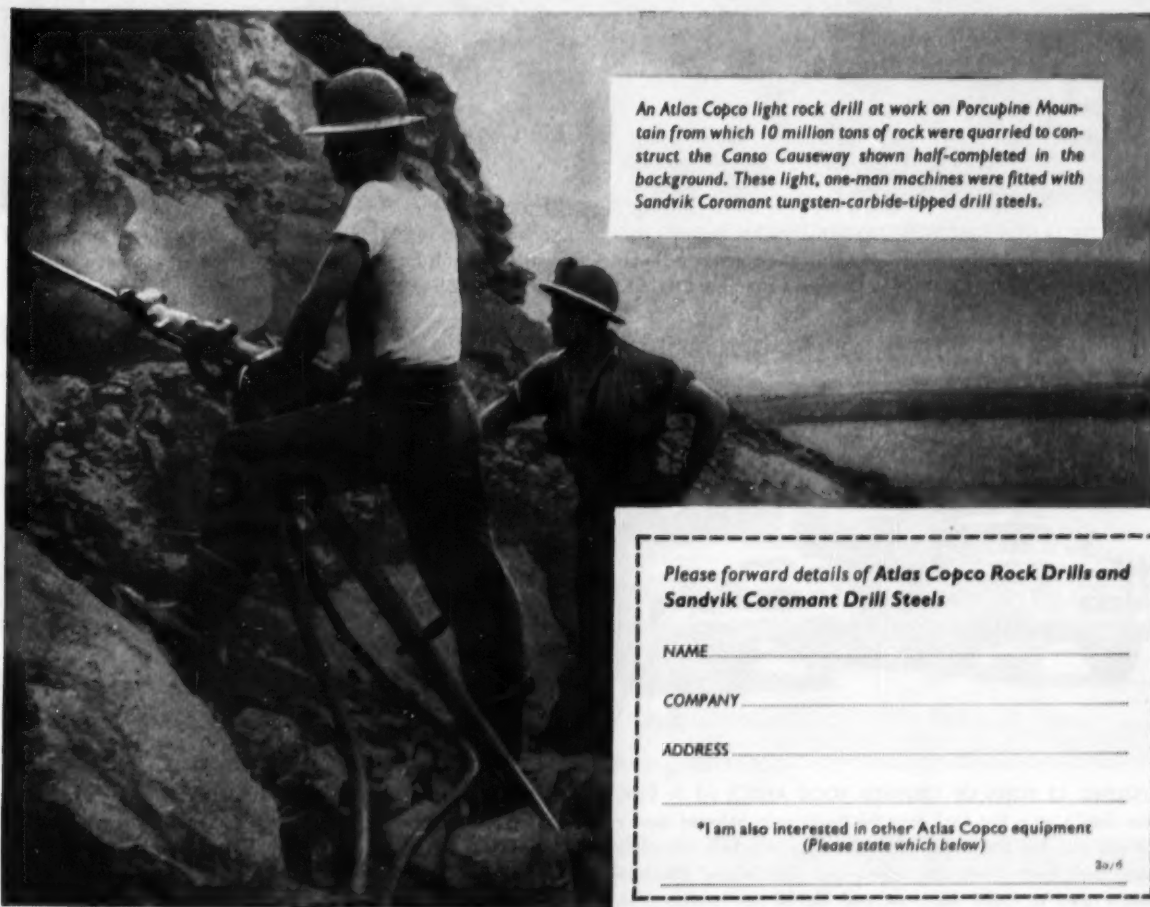
MAIL THE COUPON BELOW to the most convenient of the addresses given here:

U.S.A., Copco Pacific Ltd., 930 Brittan Avenue, San Carlos, California; Copco Eastern Ltd., P.O. Box 2568, Paterson 2, N.J.; CANADA, Canadian Copco, Ltd., Montreal, A.M.F., Quebec; MEXICO, Atlas Copco Mexicana, S.A., Apartado Postal 56, Torreon, Coahuila; PERU, Compania Atlas del Perú, S.A., Apartado 2982, Lima.

UNITED KINGDOM, The Atlas Diesel Co. Ltd., Wembley, Middx.; FRANCE, Atlas Polar S.A., 29, Rue Marbeuf, Paris 8e; HOLLAND, N.V. Holland-Atlas, P.O. Box 6056, Rotterdam; ITALY, S.A.M.P.A., Viale Marche 15, Milan.

AUSTRALIA, Australian Atlas Company Pty., Limited, P.O. Box 54, Auburn, N.S.W.; SOUTH AFRICA, Delfos Pty Ltd., P.O. Box 504, Benoni, Transvaal.

Readers in countries outside those listed above and who do not know the name of their local Atlas Copco company or agent, please write, in the first instance, to AB Atlas Diesel, Stockholm 1, Sweden.



An Atlas Copco light rock drill at work on Porcupine Mountain from which 10 million tons of rock were quarried to construct the Canso Causeway shown half-completed in the background. These light, one-man machines were fitted with Sandvik Coromant tungsten-carbide-tipped drill steels.

Please forward details of **Atlas Copco Rock Drills and Sandvik Coromant Drill Steels**

NAME _____

COMPANY _____

ADDRESS _____

☐ I am also interested in other Atlas Copco equipment
(Please state which below)

20/6

*Manufacturers of Stationary and Portable Compressors, Rock-Drilling Equipment, Loaders, Pneumatic Tools and Paint-Spraying Equipment

T H E A T L A S C O P C O G R O U P O F C O M P A N I E S

(Advertisement)

Rolling out the carpet for the Air Force —at 200 tons an hour

Bowen Construction's new GMC fleet speeds crushed rock deliveries for
new runways at Sedalia AF Base



A TEAM OF 14 NEW GMC W503 TANDEMS are handling this half-million-dollar improvement project at Sedalia Air Force Base, Knobnoster, Missouri. Bowen Construction Company of Kansas City, Mo.,

contracted to supply 170,000 tons of crushed rock and 30,000 tons of asphalt for paving. The job was rushed to completion by the new GMC's—delivering 200 tons of the crushed rock each hour.



HUSTLING 13 TONS OF CRUSHED ROCK APIECE AT A CLIP, these GMC's set a fast pace over the 9-mile span between quarry and job site. The trucks use 10-yard bodies with twin telescopic hoists. Their hefty loads are carried over GMC's new oversized axles—rated at 7,000 lbs. front and 22,000 lbs. tandem rear.



POWER TO PULL THROUGH THE ROUGHEST GOING comes from the W503's big new 155-horsepower engine. Despite the stop-and-go nature of the paving operation, the 14 trucks are averaging 7 mpg. The contractor's satisfaction with GMC tandems—one of 19-models—is evidenced by his recent order for 6 additional units.

GMC TRUCK & COACH — A General Motors Division

It Takes These TWO



FOR TOP PERFORMANCE

All-Wheel Drive for 30% more Power-at-the-Blade when the going is tough... All-Wheel Steer for 100% greater maneuverability. Working together, these exclusive Austin-Western features form an unbeatable team, capable of han-

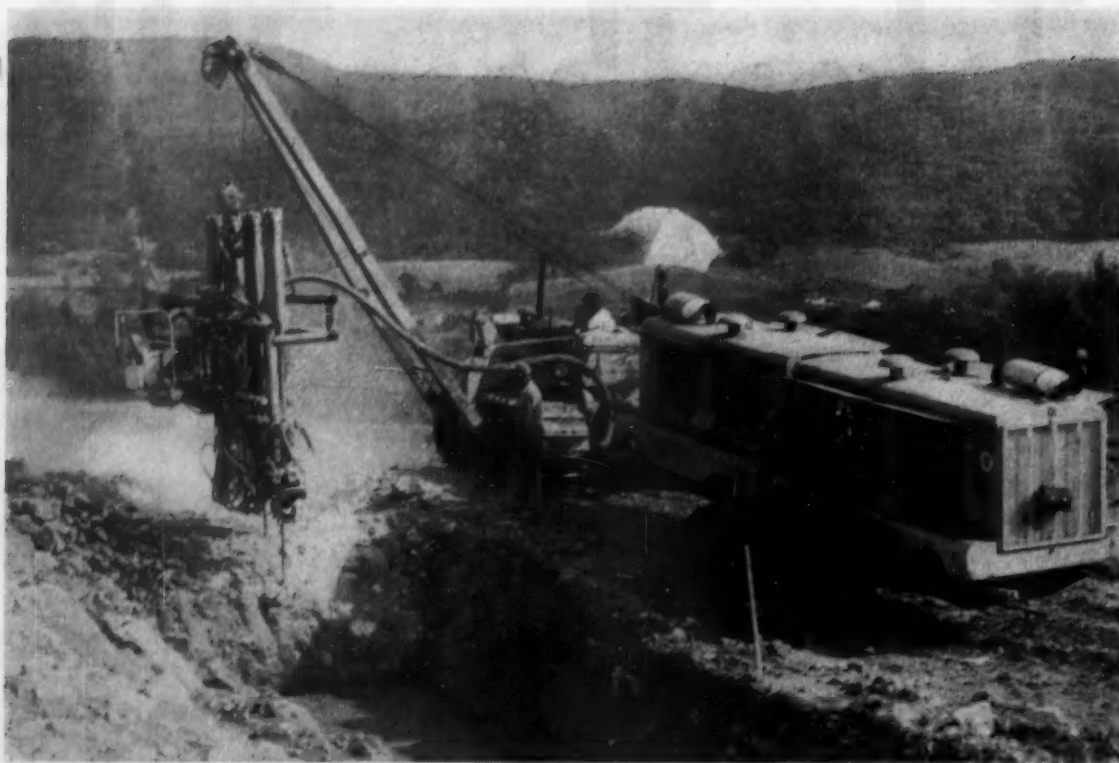
dling the widest variety of jobs... straight through the year... with speed and efficiency which the ordinary rear-drive, front-steer motor grader can't hope to equal. Why be satisfied with less in your next grader?

Austin-Western
Power Graders • Motor Sweepers
Road Rollers • Hydraulic Cranes



Construction Equipment Division

Manufactured by
AUSTIN-WESTERN COMPANY
Subsidiary of Baldwin-Lima-Hamilton Corporation
AURORA, ILLINOIS, U.S.A.



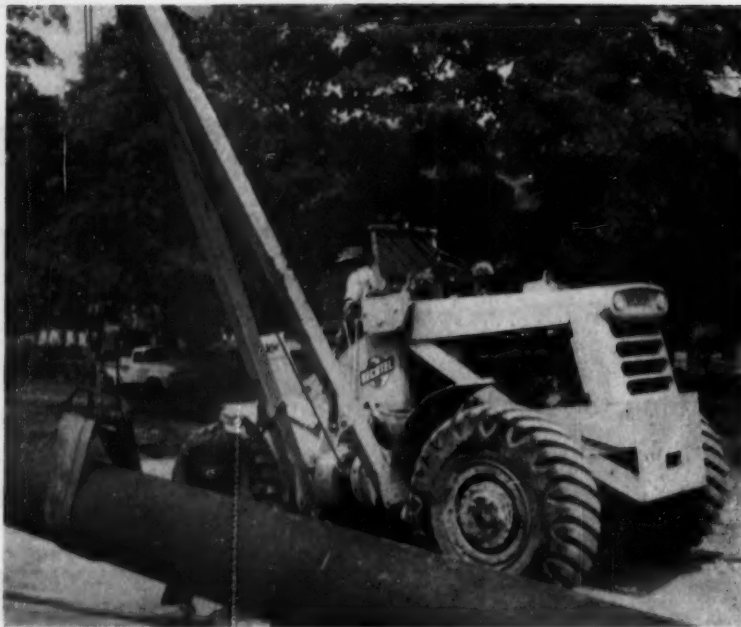
Quadruple drill takes over trench excavation in rock as . . .

Special Tools Spark Pipeline Job

BECHTEL CORP. CREWS stringing 94 mi of 24-in. pipe from Hawley, Pa., to Greenwich, Conn., for Tennessee Gas Transmission Co. have had no easy task: Hurricanes and floods delayed them, rock cuts are as deep as 30 ft, and in heavily congested Westchester County alone (16½ mi) the pipe must cross six railroads, 19 streams, 56 roads.

But special machines and hard work are bringing the line to completion. One of the machines is shown above. It's a Gardner-Denver quadruple boom unit controlled by air. A Cat MD7 handles the rig and also tows two G-D 600-ft rotary compressors mounted back-to-back on Athey tracks. Other tools and techniques used by the spreads under Construction Manager Bob Bowman and General Superintendent Joe Work are pictured on this and following pages.

Bechtel doesn't neglect the fine points either. All trucks carry cold drinking water and paper cups, for example, along with a container for used cups to keep litter off the right-of-way.



RUBBER-TIRED SIDEBOOM is fast and maneuverable machine for handling heavy pipe sections. Carco winch on near side of converted Michigan tractor-shovel powers the load line, while similar winch on far side operates the boom.



HYDRAULIC PIPE PULLER jacks 30-in. casing 105 ft through high-way embankment. Bechtel uses this Greenlee jacking apparatus in boulder-laden ground where a boring machine is not practicable.



MUCK TUB that removes spoil from casing is merely an oil drum split in half and mounted on casters. Jacking is slow process, for men must break out boulders ahead of casing with air hammers.



MOVABLE COUNTERWEIGHTS on Michigan sideboom tractor are operated by hydraulic ram. Here machine unloads and strings pipe on countrified right-of-way, but rig is especially useful when it is

necessary to lay pipe in city streets. Pipe is 24 in. OD National Tube seamless that is cold expanded to minimum yield of 52,000 psi. Wall thickness is $\frac{1}{2}$ in. (More photos on next page)



PIPE FRAMES protect all of Bechtel's pumps from damage, yet leave them readily accessible for servicing. These two units sucking rain water from trench are CMC diaphragm and 40M centrifugal.



BACKHOES, indispensable on pipeline work, pace Tennessee Gas Transmission Co. project. At top is Bucyrus-Erie 22-B with extra-heavy undercarriage. Above, Cat D8 gives another 22-B an assist.

(More photos on page 112) ●



BORING MACHINE installs 30-in. casing through railroad embankment. Cat MD7 pipelayer, additionally counterweighted with concrete river clamp, holds Crosse rig that is fitted with Ka-Mo



auger flights. As machine bores, D8 winch-tractor forces casing ahead by line through snatch block on deadman at foot of embankment. At right, workmen add water to help lubricate the auger.



One of Rowe Construction's
50 pieces of heavy machinery

"Fifty Pieces of Heavy Machinery... No Sludge, No Carbon!"

Cat Motors Now Run 12,000 Hours Before Overhaul with Cities Service C-300 Motor Oil!

For the last 30 years, Delmar Rowe has been building roads. And for the last seven years, Cities Service Lubricants have paved his way to greater profits. The firm is Rowe Construction Co., Bloomington, Illinois...and since 1925, it has not only built countless roads, but has also reclaimed land, supplied gravel, and constructed sewers and water mains throughout the Bloomington area.

Rowe's choice of Cities Service Lubricants was no hit-or-miss proposition. "At that time," he says, "I'd had 23 years observing down-to-earth lubrication problems with construction machinery...and I was determined to find lubricants that gave the down-to-earth performance to solve these problems. Cities Service supplied the answer."

HOW RIGHT WAS ROWE? His Cat motors are a good example. They now run as long as 12,000 hours before overhaul using Cities Service C-300 Motor Oil. He reports: "There's no sludge or carbon problem and bearing life has been excellent. Other pieces of equipment show similar results. Obviously, we're saving on maintenance costs, and obviously it's showing up in the profit column."

Delmar Rowe is but one more construction man who's found Cities Service Lubrication the road to increased efficiency, lowered costs. Why not learn what it can do for you? Contact your nearest Cities Service representative or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES  SERVICE
QUALITY PETROLEUM PRODUCTS

Tough Jobs for Tough Machines. Rowe has 50 pieces of heavy machinery constantly at work, including 8 drag line cranes, 2 crushing plants, 4 bulldozers, 5 end loaders and 28 cars and trucks.



One of Rowe's 19 Dump Trucks fills up with Cities Service Gasoline...a powerful treat for a hungry engine. Rowe also uses Cities Service Diesel Fuels, C-300 Motor Oil, and Trojan Greases.



Best bet for better bids—

SPECIFY

**GENERAL MOTORS
DIESEL POWER**

in all your construction equipment

You can *specify* General Motors Diesel power in over 750 different models of equipment built by over 150 manufacturers.

When you do you'll get fast-acting, quick-accelerating 2-cycle Diesel power that will help you do more work, faster, at less cost.

More work, because a General Motors Diesel is a "high torque" engine. And torque—as much as developed horsepower—measures an engine's working ability.

Faster work, because a GM 2-cycle Diesel, with its responsive governor, efficient fuel injectors and power at every piston downstroke, gives you instant pickup in response to changing loads.

Less cost, because a General Motors Diesel burns fewer gallons of safer, cheaper fuel. Also a GM Diesel costs less to buy and the parts cost less than for other Diesels of comparable ratings.

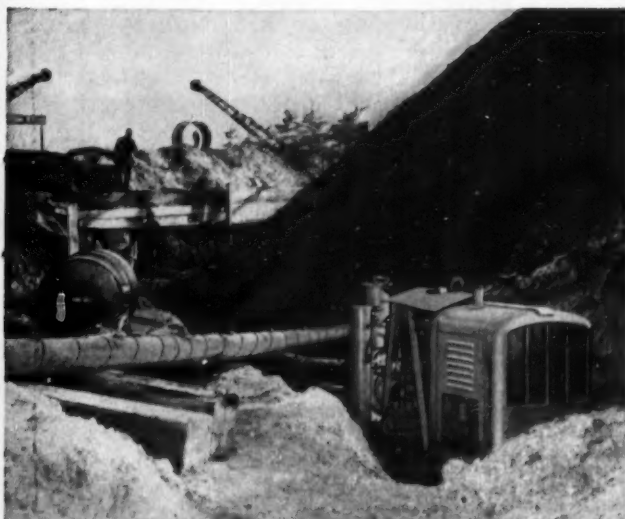
No matter where your contracts take you, you'll find GM Diesel distributors ready to supply fast service and quick delivery of low-cost factory parts. Check your local distributor today for full details on dependable, low-cost Diesel power for your equipment, or write direct for more information.



PURCHASED 23 GM DIESELS SINCE 1947

This LeTourneau-Westinghouse Tournapull is part of an earth-moving fleet used by the Lone Star Steel Company of Lone Star, Texas. The Company, one of the largest producers of steel in the Southwest, has been a consistent user of General Motors 2-cycle Diesel engines in several different kinds of earth-moving, construction and mining equipment for better than seven years.





SAVING \$170.00 A MONTH IN FUEL ALONE

United Construction Company cut fuel costs over 60% and reduced maintenance costs when they switched from gasoline to GM Diesel power on their Moretrench pumps. The GM Diesels worked 24 hours a day, 7 days a week—eliminated stops formerly required to pull and service spark plugs every three days and to replace them every three weeks.



13,000 HOURS—NO REPAIRS

General Contractor A. H. Famularo bought this GM Diesel-powered Northwest 25 Crane in April 1947. In 13,000 hours he never had an injector out, never touched the head or pan. He burns 16 gallons of low-cost Diesel fuel in 8 hours—specified GM Diesel power "because it was economical . . . and has proved to be reliable."



25% MORE WORK; FUEL COSTS 1/3 LESS

Killough Construction Company has standardized on GM Diesel power for their portable rock crushing plant in Kansas. The firm uses six GM Diesels to run a hammer mill, operate conveyors and screens, a primary crusher and two shovels. One shovel, converted from gasoline to GM Diesel power, now does 25% more work on one-third less fuel cost.



"WONDERFUL PERFORMER"

This GM Diesel-powered scraper hauled nine yards every four minutes on a recent job for the R. J. Boe Construction Company. Contractor Russell Boe likes the "wonderful acceleration and trouble-free performance GM Diesel power gives me." He says, "All you need to do is keep water, oil and clean fuel in that GM Diesel and you'll get a good day's work out of it."

DETROIT DIESEL ENGINE DIVISION

GENERAL MOTORS • DETROIT 28, MICHIGAN

Single Engines . . . 30 to 300 H.P. • Multiple Units . . . Up to 893 H.P.



BLASTING MAT is snaked from ditch as Lorain TL-25 claws out shot rock. Much of pipeline route parallels important highways that must be kept open to traffic, confining job operations.



BACKFILLER assists 22-B hoe, which is digging deep trench, by pulling spoil pile out of way. Cleveland 190 machine normally follows the pipeline spread, backfilling and tamping the ditch.



PIPE TONGS hold special bend section of pipe while end is beveled for welding. Many specials are required on 16½-mi stretch of line through highly developed New York City suburbs.



STEEL SHEETPIILING is driven to support sides of deep trench to be excavated in wet ground. Sheeting is rented from L. B. Foster Co., who deliver the 35- to 40-ft lengths as required so there is no storage

problem. McKiernan-Terry 9-B-3 hammer that drives piles is handled by Lorain crane and operated by air from Gardner-Denver 600-cfm rotary compressor. (More photos on page 115)

The Engineer's Field Report

CASE HISTORY
RPM Multi-Service
 LUBRICANT *Gear Lub.*
Rothschild, Raffin & Weirick
 FIRM *San Francisco, Calif.*

"No trace of wear" in gear boxes or rear ends after 4½ years of heavy construction work!



WORKING AT CHERRY VALLEY DAM in California's High Sierra, RR&W operates a wide variety of heavy equipment in handling all concrete requirements. For complete protection on this job and to prevent costly maintenance, the firm uses RPM Multi-Service Gear Lubricant in all rear ends and gear boxes. Heard Bonner, Master Mechanic, reports "my Chevrolet pickup has 96,000 miles on it and it's never been worked on. We haven't lost a rear end or a gear in in almost five years of tough work. Every rear end we've ever inspected has been completely clean without a trace of wear."

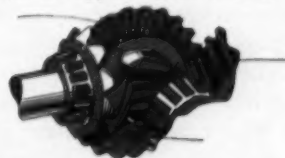
The 163 h.p. Scoopmobile (above left) loads aggregates at batch plant. The Northwest crane (right) with a Murphy diesel engine, lifts and positions 8-ton, 15'4" OD tunnel liner sections. Other RR&W equipment using



RPM Multi-Service Gear Lubricant includes four ready-mix trucks, three dump trucks, a 3/4-yard Unit crane, and three bulldozers.

Why RPM Multi-Service Gear Lubricant prevents wear in severe conditions

Contains a special compound that reacts chemically with metal to form a protective lubricating coating...resists rubbing action of hypoid gear teeth.



Withstands extreme temperatures and pressures...highly oxidation resistant. Keeps gears and bearings cool. Inhibitors resist rusting, stop foaming in cases. Lubricates integral bearings and other parts. Will not separate.

FOR MORE INFORMATION about this or other petroleum products of any kind, or the name of your distributor, write or call any of the companies listed below.



TRADEMARK "RPM" REG. U. S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20 • STANDARD OIL COMPANY OF TEXAS, El Paso
 THE CALIFORNIA OIL COMPANY, Barber, New Jersey • THE CALIFORNIA COMPANY, Denver 1, Colorado

BUCYRUS-ERIE TRANSIT CRANE



Despite unstable, sandy footing, Tomei's 22-B Transit Crane handled 45- to 78-in. reinforced concrete pipe sections weighing up to 9½ tons, without difficulty. Operator Solem said he particularly liked the machine's ability to "boom down" with load, using the engine as a brake. He found this especially handy with heavy loads.

Does Double Duty for California Contractor

While J. Tomei and Sons Construction Co. were laying 5,000 feet of storm sewer pipe at Los Angeles International Airport, they were also working a road job at Palos Verdes 14 miles away. The Tomeis put a fast-moving 22-B Transit Crane to work servicing both projects.

From long experience, they knew that a Transit Crane's travel speed and quick, easy convertibility to shovel, dragline, clamshell, or dragshovel makes it ideal for multiple assignments.

A Transit Crane offers other outstanding features, too: friction swing brake to permit holding boom point over desired spots . . . power-controlled lowering for main hoist line . . . independent power boom hoist with power-controlled lowering . . . open-throat design for multiple-line rigging without removing sheave guards . . . 8- or 16-part pendant suspension for quick change of boom length . . . safety boom stops . . . and boom angle indicator.

These are all *standard features* on a Transit Crane — you pay nothing extra for the extra value. Investigate the profit-making Transit Crane soon. Your Bucyrus-Erie distributor has complete details on both the 25-ton 22-B and the 15-ton 15-B.

154E55





WELLPOINT SYSTEM dries up stream bed which is being clammed across site through two 24-in. pipes (center) by sandbagged dike out for pipeline crossing. Stream has been temporarily diverted in background. Similar dike acts as downstream cofferdam.

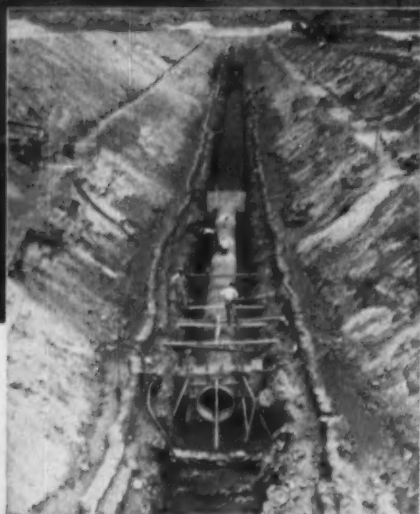
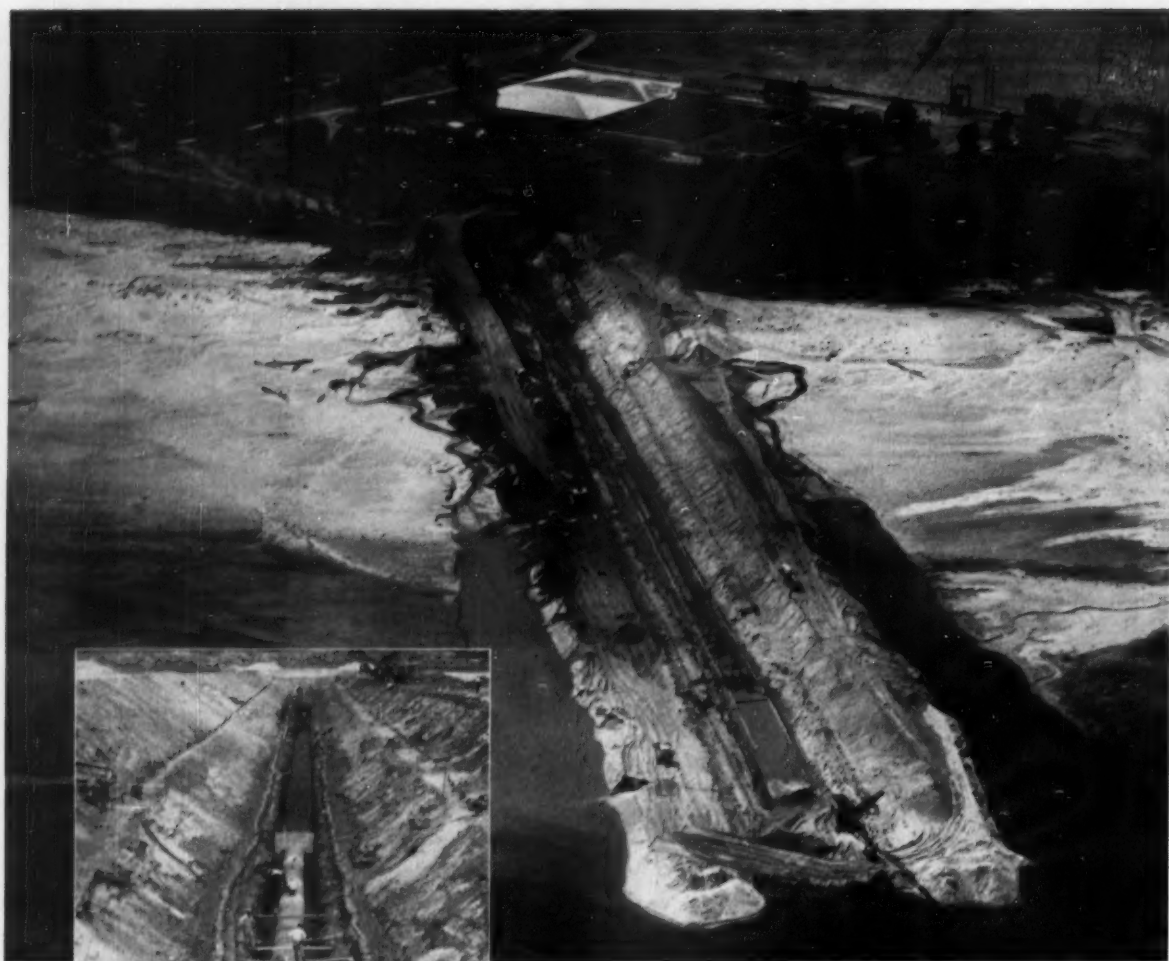
(More photos on page 118)



PRECOATED PIPE is assembled in ditch. Coating consists of cold tar primer, 3/32-in. modified cold tar enamel into which Fiberglas is drawn, glass felt, second enamel coat, asbestos felt.



VERSATILE UNITS that help out with odd jobs are Harris Power Horses. Four-wheel-drive machines are powered by Chrysler engines, and here are fitted with dezer and Ottawa front-end loader.



*Water, Water Everywhere but
not a drop inside!*

STANG
PUTS THE SQUEEZE
ON THE
ARKANSAS
RIVER

KEEPING THE WATER LEVEL DOWN with a wild, often summer-flooded river like the Arkansas all around you is a big order. That's why the STANG Wellpoint Engineers were called in to make possible the laying of this 54" water conduit with the river open.

STANG has successfully handled water problems the world over for many years. Our trained engineers have the capability and experience necessary to design the *exact* system to most efficiently and economically beat your particular unwatering problem.

If you have a water problem on a current project (or on one you may be bidding) contact STANG. You will receive a thorough analysis of your project needs and our recommendations *at no cost or obligation to you.*

Write today for our free 100-page Brochure on the STANG WELLPOINT SYSTEM.

Putting water
in its place



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553



Model 705-B Runabout Service Ditcher. Designed for scattered jobs. Vertical boom. Fluid Drive. Hydra-Crowd. 15 miles per hour travel. Widths up to 10½". Depths to 4'.

DIG

DIG for profit.

DIG long jobs.

DIG scattered jobs.

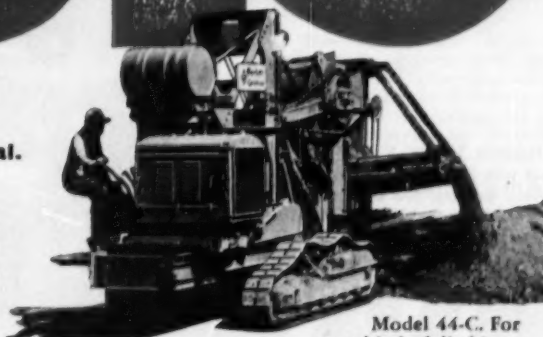
DIG with Hydra-Crowd and Fluid Drive.

DIG with new curved teeth that last 3 to 5 times longer.

DIG through frozen ground, asphalt pavement, coral rock—virtually any material.

DIG with the vertical boom that leaves no ramp, operates in closest quarters, digs right up to obstructions.

DIG with the machine that was engineered to DIG and get to the next job.



Model 44-C. For every kind of ditching up to 24" wide and 8'3" deep.

You don't have to DIG for the facts. They will be sent at your request.

54-33-D

WRITE for
INFORMATION

descriptive literature . . . sound movies
cost studies . . . nearby job inspection . . . plant layouts

Barber-Greene

AURORA, ILLINOIS, U.S.A.

CONVEYORS

LOADERS

DITCHERS

ASPHALT PAVING EQUIPMENT





TIE-IN WELD is made under difficulties. Hydraulic jacks to timbers safety hooks that suspend belt slings: they are made by welding at wall of rocky trench helped with the line-up. Note job-built two large nuts to hook, then inserting smaller bolt.

→ **WELDING TRUCK** is fully equipped. Ford truck with Fabco 4-wheel drive carries Crose cutting machine, two 400-amp Lincoln welders, acetylene welding and burning equipment, Thor electric grinder and buffer, Tipton line-up clamp, and small tools.

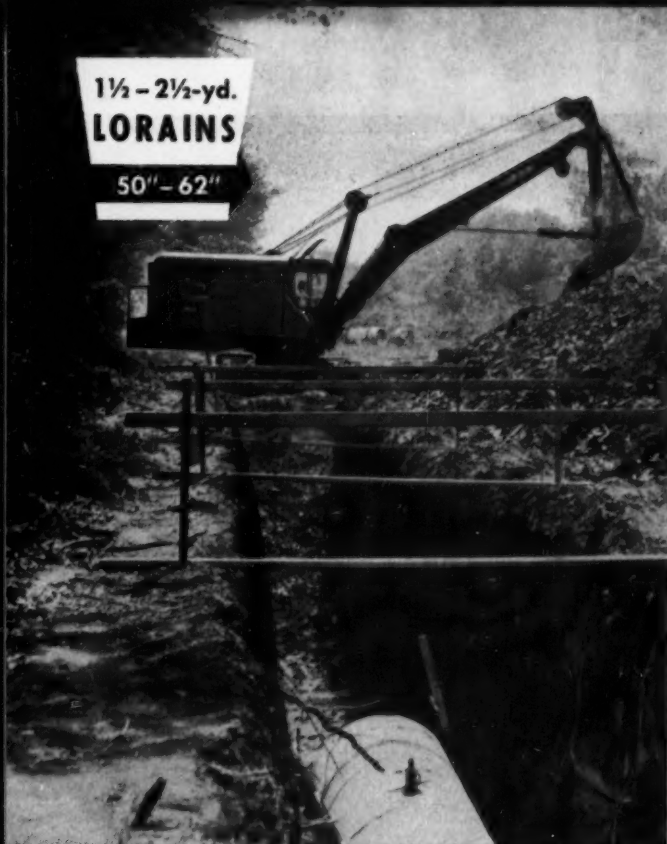


→ **OLD RUBBER TIRES**, rolled ahead in bucket-brigade fashion, make fine matting to keep cleated crawler tracks from damaging concrete pavement. They are cheaper and far more easy to handle than the timber planking that is sometimes used.



1½ - 2½-yd.
LORAINS

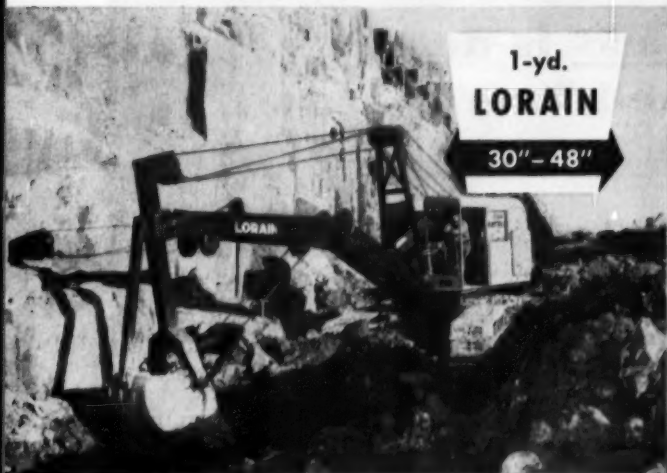
50" - 62"



Above: Digging through 14 to 22 ft. of unshot shale.

1-yd.
LORAIN

30" - 48"



Above: Digging through shot rock on the New York Thruway.

Below: This Lorain digs sewer trench through 12 ft. of rock.

½ - ¾-yd.
LORAINS

24" - 40"



YOU CAN MAKE **DOUGH** WITH A **LORAIN HOE**

Cost-conscious, profit-conscious contractors learned long ago that there is money to be made with Lorain Hoes on any kind of below-ground level excavating, whether it's for trenches, basements, footings, foundations or grading.

That's because, no matter what size Lorain you choose, Lorain Hoes are designed for the extra production that makes so much difference in the profit column. The booms are all-welded box sections for extra strength and weight . . . weight that gives the maximum "crowding" effort and stability to dig hard materials. Booms are tapered for maximum operator visibility in trenches—in maximum lengths with goosenecked "offset" for deeper digging ranges—and the buckets are non-heeling, clean-cutting, easy-dumping. Available in bucket widths from 20" to 62", in a range for each class of machine—mounted on crawler, Self-Propelled, or Moto-Crane carriers—there is the widest possible choice of sizes and mountings to fit your needs. Of course, Lorain hoe booms are easily interchangeable with clamshell, crane, dragline or shovel.

If it's a job for a hoe—big or small—let your Thew-Lorain Distributor show you why you can make dough with a Lorain Hoe.

FREE BOOKLET ON LORAIN HOES



See how contractors, large and small, make money with Lorain Hoes. Send for this booklet containing big pictures of Lorain Hoes in action with interesting job facts and figures. Write for your copy today!

THE THEW SHOVEL CO., LORAIN, OHIO

THEW **LORAIN**®

Below: This Dixie digs basements in red shale.

¾-yd.
DIXIE

20" - 30"





Anything Less is an Old-Fashioned Truck!

If you don't get all the modern advantages new Chevrolet trucks offer, you stand to lose money on the job today and at trade-in time tomorrow

Look at it this way. The more modern the truck, the more quickly and efficiently it does the job. And if it's loaded with ultra-modern features, you're bound to be farther ahead at trade-in time. Now look at the way Chevrolet fills the bill. Even so-called new trucks are old fashioned without all these Task-Force advantages!

Shortest stroke V8's* of any leading truck—the most modern truck engines money can buy! Their compact, short-stroke design means longer life, because of less friction and wear. Chevrolet's extra-rugged and dependable high-compression valve-in-head Sixes are ultra economical to

keep humming. They squeeze more power out of a tankful of gas!

The latest in cab comfort and safety—High-Level ventilation, panoramic windshield, concealed Safety Steps—features that boost driver efficiency!

Most modern chassis features—new suspension, more rigid ladder-type frames, Power Brakes standard equipment on 2-ton jobs!

Work Styling—Here's heavy-duty styling that's matched to the job; modern styling that calls attention to your business! Your Chevrolet dealer has complete details. See him soon. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

*V8 standard in L.C.F. models, an extra-cost option in all others except Forward-Control models.

NEW CHEVROLET **Task-Force TRUCKS**

70 Years of Achievement



Today, in the field of metal decorating, the roll coating machine is used for large scale production, replacing the old method of brushing by hand.

Finishes made for this field require developing and testing on the same type of equipment as is used on the production line.

Here at TOUSEY we are staffed with men and equipment that can properly test as well as produce these finishes.

TOUSEY offers its 70 years of know-how to its ever-increasing list of customers and prospects—WRITE TODAY.



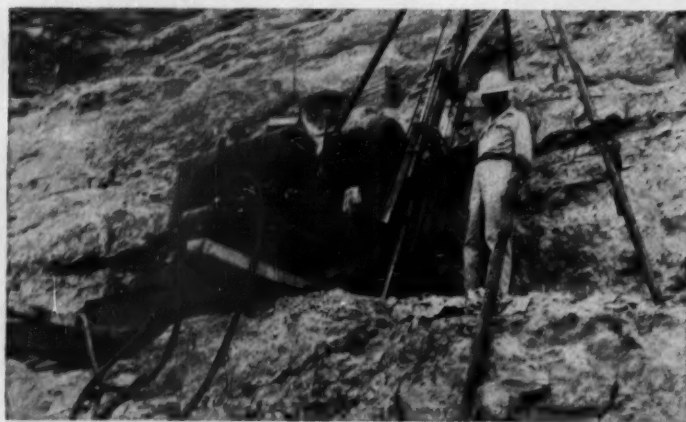
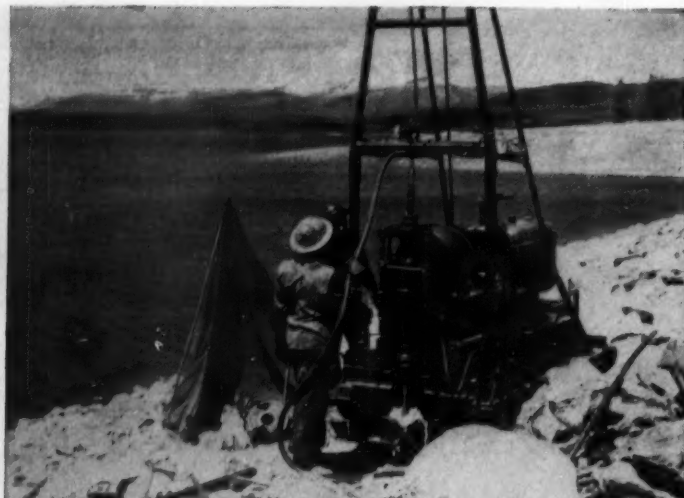
TOUSEY VARNISH COMPANY

520 W. 25TH ST., CHICAGO 16, ILLINOIS

JOY CORE DRILLS

for
**FOUNDATION
TESTING**

or
**GROUT HOLE
DRILLING**



FIRST ON YOUR BRIDGE OR DAM JOB

You get a 3-way advantage by using Joy diamond core drills for foundation testing and grout hole drilling on your bridge, dam, or other heavy construction job...

1. Extreme mobility—Steel skid mountings make moving a simple, fast operation, and cut lost time between holes to a minimum. Truck-mounted models are also available for the utmost in mobility, where terrain conditions permit the use of such mounting.
2. High drilling speed—Efficient operation, designed into Joy core drills over many years of manufacture, insures faster drilling of holes no matter what type of drilling is being one.

3. Highly accurate results—Precise control of all operations of Joy core drills makes possible the taking of accurate cores, and helps the operator to "feel" cracks and fissures when drilling grout holes.

Three models of Joy Core Drills are available—the No. 7, a lightweight, highly portable unit; the 12-B, for drilling to medium depths; and the 22-HD, a heavy-duty machine for tough requirements. Try these drills, made by the pioneer of core drill manufacturers, on your next bridge or dam job. Write for details to Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa. In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.



22-HD Drill
Bulletin D-28

12-B Drill
Bulletin D-21

Write for your
free copy today



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JOY

**WORLD'S LARGEST BUILDER OF CORE
DRILLS, ROTARY BLAST HOLE DRILLS
AND MOTORIZED DRILL RIGS**

Automation Creates Jobs For Workers With Skills

There is new and reassuring information for those who fear that "automation" — the control of machines by machines — will mean fewer job opportunities. It comes from a special survey of 1,574 companies in metalworking industries recently completed by *AMERICAN MACHINIST*, a McGraw-Hill publication. More than one-fifth of the companies reported that they already have automatic loading, transfer or assembly machinery in operation. In these companies as a whole there has been a net increase in total employment since this machinery was installed.

According to the *AMERICAN MACHINIST* survey, of these companies with actual experience in automation

26% reported increases in employment
averaging 21%

51% reported no change in total employment

23% reported decreases in employment
averaging 16%

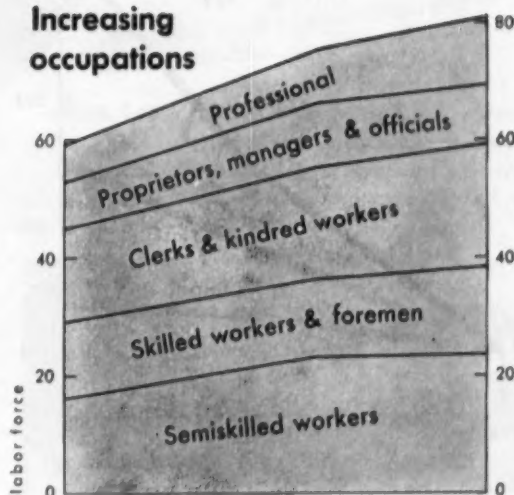
More Jobs for the Skilled

Of greater significance, however, is the response by 40% of these companies that they required more skilled maintenance men and by 21% of the companies that they had increased their engineering staffs. This indicates that automation is strengthening a trend already evident in the United States, a trend of expanding opportunity for those with industrial and professional skills and, relatively, of contracting opportunity for the unskilled.

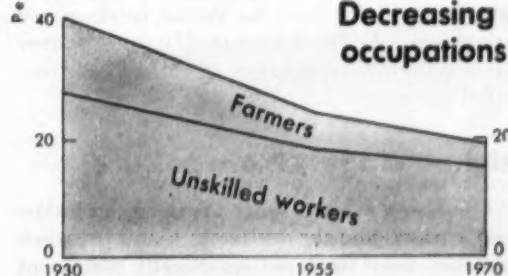
The following chart shows how strong this trend has been over the past 25 years and how strong it may be expected to be over the next 15 years.

There has been a sharp decline in the percentage of unskilled workers in the nation's labor force and a corresponding increase in the percentage of those with varying degrees of skill.

Increasing occupations



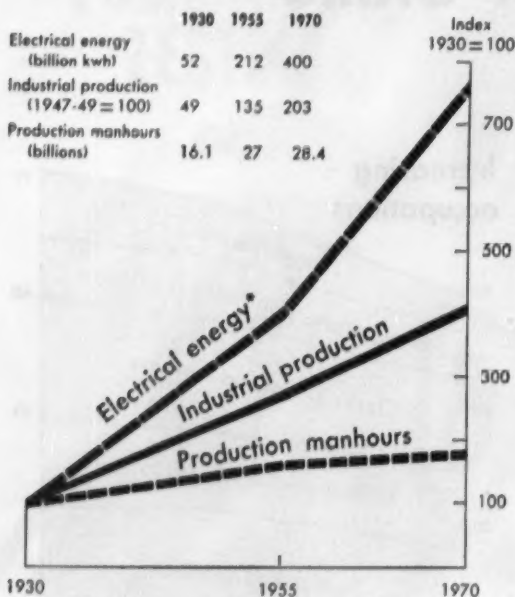
Decreasing occupations



It is possible, of course, to cite cases of individuals and groups that do not conform to the charted trends. Farmers, for example, are becoming at the same time more skilled and less numerous. But this does not upset the broad proposition that opportunities are increasing for those who have skills.

Power and Production

Much of the basic explanation for the relative expansion of opportunities for those with industrial and professional skills lies in the increasing use of power-driven machinery. This has made possible a vastly greater increase in manufacturing production than in the manhours of human labor devoted to it. The following chart shows the relative increases in electrical energy and manhours of labor used in manufacturing since 1930 and the rise in industrial production.

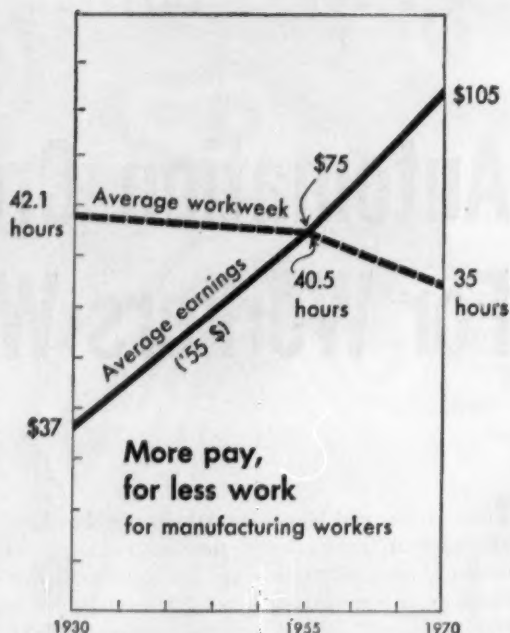


*Excludes power used in aluminum and magnesium reduction, both very heavy power users.

Power-driven machines have reduced the amount of human energy required for physical labor, but they have increased the need for skillful handling and maintenance. As the AMERICAN MACHINIST survey demonstrates, the same is true of automatically controlled machinery.

Higher Wages, More Leisure

The rising average wage of American industrial workers and the decline in hours per week that they must work reflect directly the extent to which the increase in industrial production has outstripped the manhours devoted to it. The final chart shows the increase in weekly wages (in dollars of constant purchasing power) and the decrease in the average workweek in manufacturing since 1930. It also shows the changes that may come in the next 15 years if present trends continue.



There are some who would slow what an earlier editorial in this series characterized as "the continuing process of taking dull and laborious work off the backs and minds of men and transferring it to machines operating in large batteries under automatic control." In doing so, they might make the world safer for those with no skill. The far more constructive course is to welcome the expanding opportunities now being provided and be sure that the nation's young people, who are now starting another school year, are prepared to take advantage of them.

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments that are of particular concern to the business and professional community served by our industrial and technical publications.

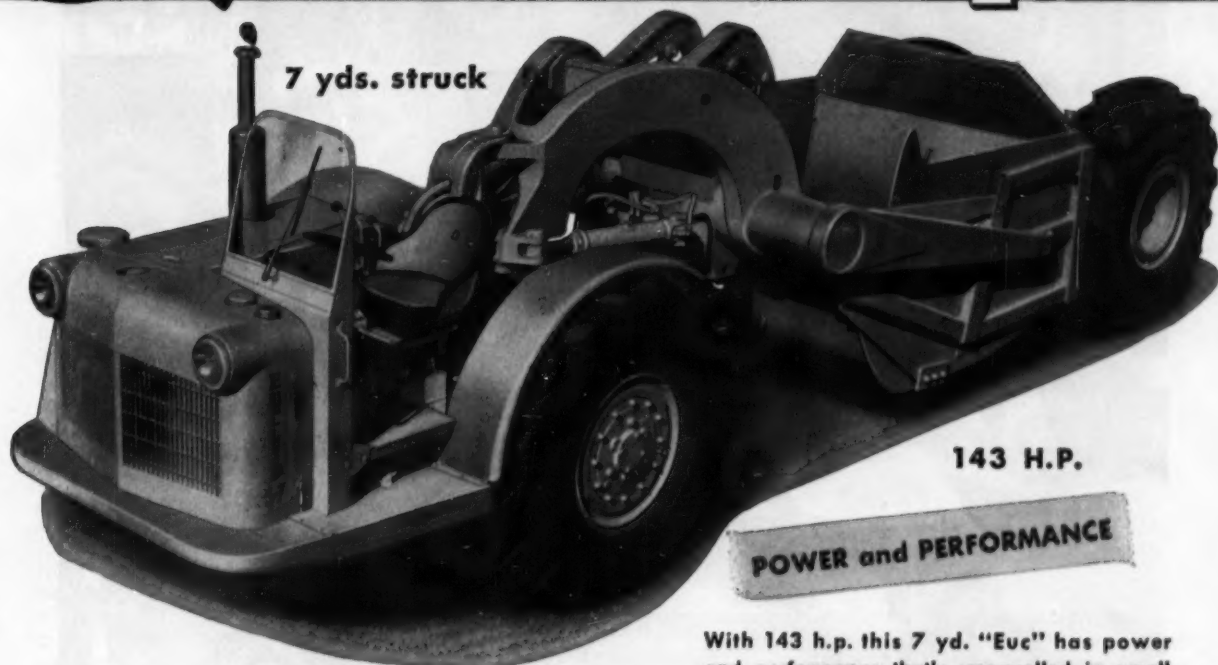
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Donald C. McGraw

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S-7 "Euc" Scraper



This "Euc" S-7 is the newest addition to Euclid's Scraper line—fastest growing line in the industry because of customer acceptance and preference. It incorporates many of the features that have made larger Euclid Scrapers tops in production and efficiency . . . and has greater accessibility than any previous "overhung" scraper on the market.

Built to Euclid's standards of rugged construction for long service life, the S-7 is engineered throughout for good accessibility of all major components, for fast loading and travel, and for ease of operation. The entire power train—engine, clutch, transmission, planetary drive axle, etc.—is easy to get at for servicing, repair or replacement. This is a mighty important cost cutting feature in a single axle prime mover.

Before you buy your next small scraper, check the profit making features of the S-7. Your Euclid dealer can show you how this new "Euc" can get more work done at lower cost than any other scraper of comparable size.

POWER and PERFORMANCE

With 143 h.p. this 7 yd. "Euc" has power and performance that's unequalled in small scrapers. . . 20 h.p. for every yard of capacity . . . 18.00 x 25 tires . . . and a top speed of 25 m.p.h. with full payload.



MANEUVERABILITY

Maneuverability—so important for close quarter work—is excellent with the S-7. Full power steering and hitch design of the two-wheel tractor provides a 29 ft. non-stop turning radius. The 18.00 x 25 or 21.00 x 25 (optional) tires have large rolling radius for good traction and flotation.

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio



Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE





In the Classroom: How It Should Be Done



In the Field: Practice Replaces Theory

School Teaches Care, Operation Of Earthmovers

By FRANK W. CORRIGAN
Assistant Editor

SOUTHERN CONTRACTORS are showing great interest in graduates of the National School of Heavy Equipment Operation, the first independently managed institution to teach the care and operation of earthmovers.

Since last April, when the first class was graduated from the 71-acre, Charlotte, N.C., campus, the school has put more than 150 men through an intensive four-week, 218-hr course of classroom and field instruction. Contractors have hired more than 90% of its graduates, few of whom ever had been on a tractor before going to the school.

Contractors' demands for the school's graduates have mounted month by month until they now exceed the supply. In many instances a contractor who has hired one man from the school will ask for additional personnel after watching the graduate demonstrate his skills.

The students hail from 13 states, Hawaii, and Canada. They sign up for one of three courses. The first teaches the care and operation of the crawler tractor and the self-propelled and tractor-drawn scraper. Another is devoted entirely to the operation of the motor grader, and the third specializes in backhoe, dragline, and clamshell techniques.

Classes are limited to 30 students a month. Tuition and dormitory accommodations cost \$250 for the grader and crawler courses, \$275 for the dragline course. Home-cooked meals cost an additional \$11 weekly. These are the only fees. No charge is made either to the contractor or to the student for placement services.

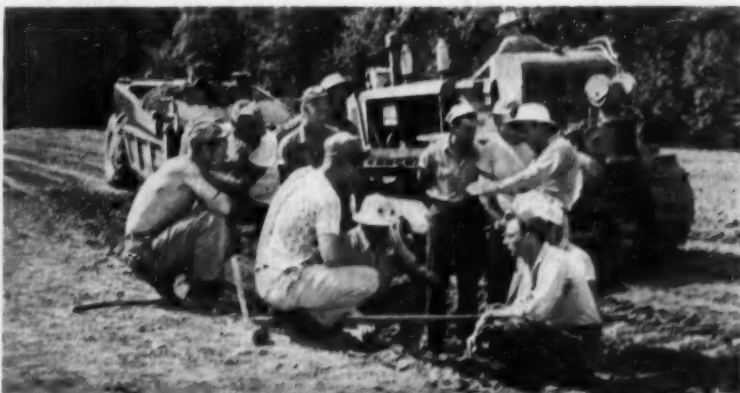
Most students have paid their own way. But contractors are beginning to enroll men from their own crews. Feeling seems to be that the tuition fee is money well spent if a man returns to work with a new respect for his equipment and a basic knowledge of
(Continued on next page)



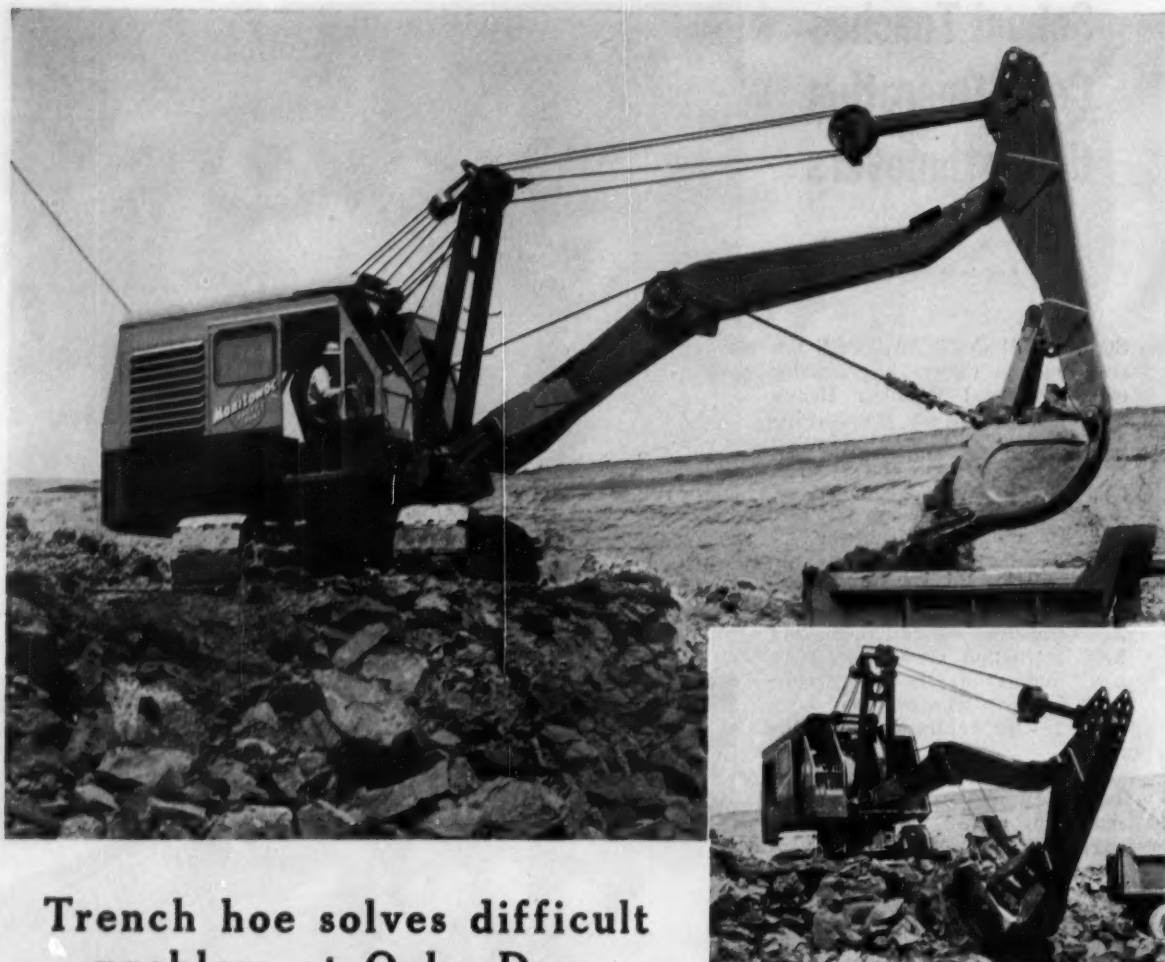
INTERVIEWING STUDENTS are John H. Marshall (left) and John Stafford (right) of J. A. Jones Construction Co., and William Crowder (2nd from right) of Crowder Construction Co.



PREVENTIVE MAINTENANCE and the ability to change a blade, adjust a cable and make simple repairs on heavy equipment are emphasized during the four-week, 218-hr course.



GRADING PRINCIPLES are explained to a group of students by instructors (white hats) as a crawler push-loads a scraper cutting fill on a section of the 71-acre practice ground.



Trench hoe solves difficult problem at Oahe Dam

Shale loading speeded up with use of trench hoe

Ingenuity always pays off — as it is for Pierre Constructors, excavating the stilling basin at Oahe Dam, Pierre, South Dakota. Approximately 114 thousand yards of tough shale must be excavated for construction of the huge basin.

Early phases of this excavation were handled with a shovel but Pierre Constructors realized that precise side wall cuts and accurate grade levels were not feasible by this method. H. B. Bruce, Project Manager for Pierre Constructors, pioneered the thought that a Manitowoc 1¼ Yd. trench hoe could do the job. The hoe has been operated from above and to the sides of the cuts and has not been confined to operation into the face of the excavation as a shovel would be. The results speak for themselves. More yardage has been removed and more important, accurate grades and precise faces have been maintained throughout the project.

Boom stiffness, unusual stability, and power to spare allow this hoe to work from any position and excavate shale without the need of blasting. The versatile Manitowoc uses a maximum of four passes in two minutes time, loading 6 Yd. trucks. Smooth torque converter drive plus air controls enable the operator to handle anything the bucket encounters with ease.

HOE HAS MANY OUTSTANDING FEATURES

This sturdy Manitowoc Hoe can dig down to 25'6", reach out 38' and can dump into the trucks with ease at any loading level. Extremely mobile, the 1¼ yd. Model 2000 can be moved as easily as a small machine. The counterweight is self-removing, enabling the hoe to be trailer moved across country — from job to job — and of course can be easily converted to shovel, crane or dragline as the operation requires. Full information on this unit, as well as sizes ranging up to 5½ yd., may be obtained from the MANITOWOC ENGINEERING CORP., MANITOWOC, WIS.

WE WANT YOUR TOUGH JOBS!

for J&L CenterFit Wire Rope

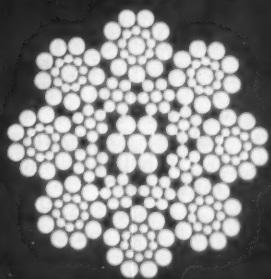
Three characteristics give J&L CenterFit Wire Rope the staying power to develop outstanding service in applications where shock, fatigue, and heavy loading limit the service life of standard wire rope.

1. CENTERFIT is the strongest standard rope produced.
2. CENTERFIT is more flexible in operation than any standard IWRC rope.
3. CENTERFIT has unsurpassed resistance to shock loading.

Over the years CenterFit has built a record for outstanding service life on the toughest applications such as shovel hoist ropes, back hoe pull ropes, and clamshell holding and closing lines where overloading is a factor.

If you're operating where loading, shock and fatigue are severe, chances are J&L CenterFit can help you cut your wire rope costs. Contact your nearest J&L Office or representative.

Jones & Laughlin
STEEL CORPORATION — Pittsburgh



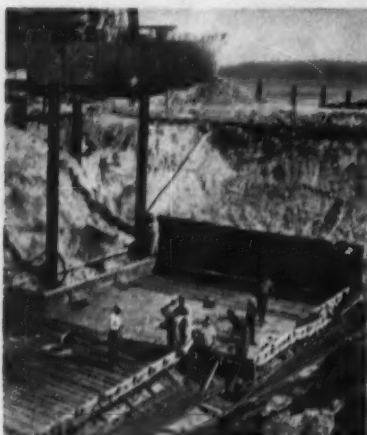
**J&L
STEEL**



HOW TO HANDLE WET JOBS

MUNICIPAL POWER PLANT STRUCTURE Jacksonville, Fla.

Contractor: George D. Auchter Co.



**WELLPOINTS LOWER WATER
OVER 20 FT IN ONE LIFT**

WHEN CONFRONTED with the problem of draining ground water to such a depth, most contractors assume that a costly 2-stage well-point system will be necessary. Today it is possible to avoid these costs, thanks to the development of improved new high-lift pumps (available only through Griffin).

- On the above job, for example, one such high-lift electric pump lowered the ground water from elevation 101 to elevation 80.7 in a single lift. Photo shows the bone-dry excavation, with men working 20 ft below adjacent St. John's River.

- Another feature of this job was the engineers' expert planning and placement of points, giving contractor trouble-free results in difficult soil—fine sand with layers of muck and hardpan.

GRIFFIN

WELLPOINT CORP.

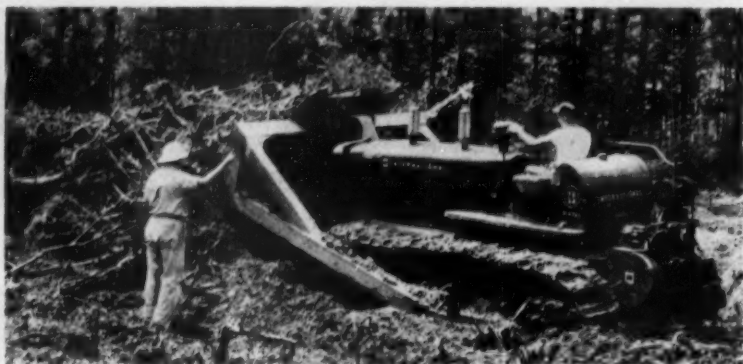
881 East 141st Street, New York 54, N. Y.
Hammond, Ind. Houston, Tex. Jacksonville, Fla.

In Canada: Construction Equipment Co., Ltd.
Toronto Montreal Halifax

OPERATORS' SCHOOL . . . Continued from page 127



CRAWLER CONTROLS held students' attention. They practice on three models of International crawlers, Northwest shovel, Gallion motor grader, and two International scrapers.



INSTRUCTOR WATCHES as student pushes a good load with big International TD 24 crawler. More than 90% of school's 150 graduates are doing construction work.

correct operating and maintenance procedures.

A student has better than \$250,000 worth of brand new earthmoving equipment to practice with, including three models of International crawlers, a Gallion 118 motor grader, a Northwest 25 shovel, an International B-91 tractor-drawn scraper, and an International 2T 55 self-propelled scraper.

North Carolina Equipment Co., an A. E. Finley & Associates distributorship supplies the equipment. The school pays only a nominal rental fee. But the equipment company takes no active part in the management of the school, does not own the 71-acre campus, and has no advertising or other tie-in with it.

A. E. Finley, the South's largest distributor with 17 sales and service organizations spread from Virginia to Florida, says he supplied the school with equipment because he feels there is a need for such

an undertaking. He also hopes that its graduates "will get to know and appreciate the equipment we handle. The operator has a lot to do with influencing a contractor's purchases."

A student spends two-thirds of his 218-hr course in the field operating the earthmovers and the remainder of his time in the classroom listening to lectures or taking tests.

"We're trying to turn out a man who understands his machine," says Everett Kendrick, the school's director of field training. "In addition to teaching basic operator skills, we emphasize such things as preventive maintenance, grading, safety, and a respect for quality as well as quantity of work. We can't turn a man into the best operator in the business in a month, and we know it. But the men are learning more of the right things here in four weeks than I managed

(Continued on page 134)

NOW! **AMERICAN EXPANDS** **CRANE-EXCAVATOR LINE** **WITH 4 NEW SIZES**

Famous American Dependability in 1/2-Yard Size and Up

Now you can have famous AMERICAN quality in 1/2-yard and in standard 3/4-yard capacities in both crawler and truck-mounted cranes and excavators! American Hoist, famous for more than three-quarters of a century in the manufacture of the most rugged lifting equipment, offers to the construction field and to industry these new highly versatile machines that are low in cost and high in performance! They combine maximum ruggedness, ease of operation and high hoist and swing speed with long, trouble-free life. You'll get top daily production with these new AMERICAN models, yet you'll find that your initial investment and cost of operation are at a minimum. These new machines take their place beside other AMERICAN crawler and truck cranes that are proving their superiority on job after job across the nation and in Canada and Mexico. See the next several pages which show these great new AMERICAN machines, available now in sizes from 1/2-yard and up.

AMERICAN HOIST

and Derrick Company

St. Paul 1, Minnesota

See next right hand page for more facts

(Advertisement)

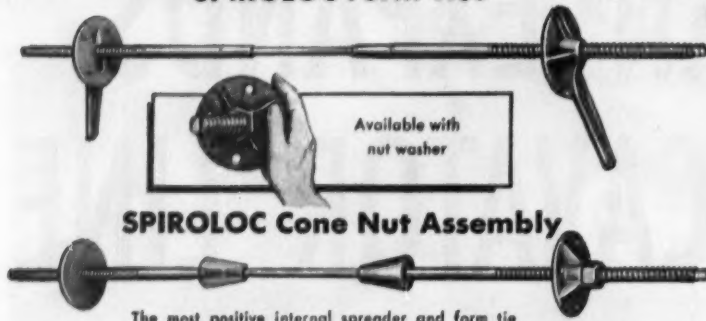


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SPIROLOC Form Ties

**Faster Erection . . . Positive Holding . . .
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Available with
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SPIROLOC Cone Nut Assembly

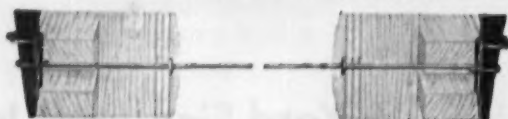
The most positive internal spreader and form tie

- Greater tie strength for heavy construction
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LOWER MATERIAL and LABOR COSTS
- Positive breakbacks
- Permanent, reuseable equipment
- RENTED . . . SOLD

TWISTYES

SNAP TIES

Positive Spreader Ties for all types of Concrete Construction



Combination wedge
and bearing plate . . .
easy application . . .
won't twist or fall off
—ample take-up.



- Low cost ties for job-built or prefabricated forms
- Used with or without walers
- Accurate breakback . . . minimum plug required
- Choice of Spreader Washer . . . 7/8" flat is standard
- Rugged Twistye and Snap Tie Clamps have extra bearing surface . . . additional safety factor



Curved ends speed installation and stripping . . . long slope wedge for ample take-up. Extra nail holes permit nailing clamp in any position.

FORM CLAMPS

The Most Versatile Tie . . . At the Lowest Cost



"Sure-Grip" principle
means positive locking
SAFE . . . SURE Tying

- 2 Form clamps and a mild steel rod make a tie to handle any condition
- Wide clamp base gives more bearing on waler . . . won't "bite" at maximum loads
- Notched base permits nailing to waler

UNIVERSAL FORM CLAMP CO.

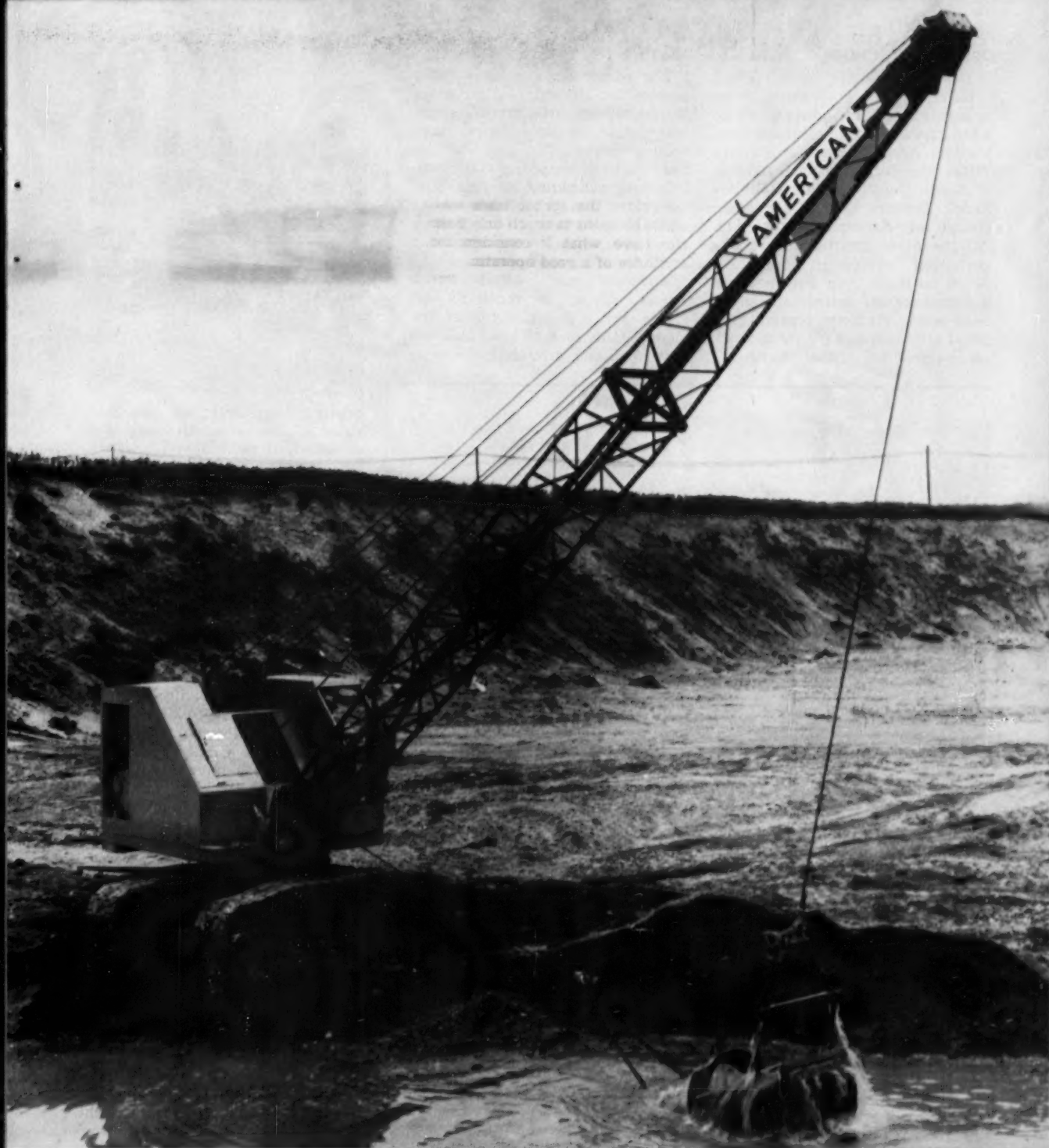
GENERAL OFFICES AND FACTORY: 1238 N. KOSTNER • CHICAGO 51, ILLINOIS

OFFICES AND WAREHOUSES:

CLEVELAND, OHIO, 24901 Lakeland Blvd. • BALTIMORE, MD., 1020 N. Kresson St.
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DISTRIBUTORS IN PRINCIPAL CITIES

Service
Wherever
You Build . . . Coast to Coast





½-YARD CRAWLER—100 SERIES. Years of research and planning went into the design of this new AMERICAN crane-excavator. Engineered for top production on any terrain—yet surprisingly low in cost! A compact machine—without an inch of waste space—easy to get at for routine maintenance. Shafts, gears and heavy wearing parts are of heat treated alloys for long life. Extremely wide clutches for safe, accurate operation . . . A producer from the word "Go!"

AMERICAN HOIST

and Derrick Company

St. Paul 1, Minnesota

See next right hand page for more facts

(Advertisement)



OPERATORS' SCHOOL . . . Continued from page 130

to pick up in 4 yrs. in the field."

Kendrick is a veteran of 30 yr in construction, including 15 yr as a job super for large southern contractors. Assistant director Sumner Willis was formerly an instructor at North Carolina State College's Truck Drivers School. He is in charge of classroom instruction. All the other instructors are experienced equipment operators. Since no more than five men are assigned to an instructor during field work, students receive personal attention and plenty of work on the machine of their choice.

The school has not been hard-pressed for students. So far more than 4,000 inquiries, representing every state in the country, have been received. The practice has been to book an entire class long before its scheduled starting date. Therefore, the school takes considerable pains to enroll only those who have what it considers the attributes of a good operator.

Aptitude and attitude are stressed almost as much as operator skill. The director of the school, Gilbert S. Shaw, believes that if he can provide contractors



CONTRACTORS APPRECIATE the emphasis placed on preventive maintenance, grading, safety, respect for employer's equipment.



No clutter or confusion at paving site. Premixed concrete delivered by Dumpcretes ready for placing.

PAVING ON THE OHIO TURNPIKE

Non-agitated Hauling Meets Every Test

On sections C-2 and C-3 of the Ohio Turnpike there's no clutter at the paving site. No paver, no water trucks, no men to run them.

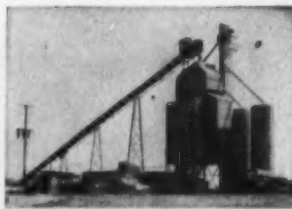
Just spreaders and finishers, plus a Dumpcrete or two discharging 4 yards of premixed concrete in 60 seconds.

The automatic central mixing plant is midway on the 10-mile job. Three men run it. 14 Dumpcretes haul its 95,000 yd. production.

Here's the bonus. The single plant supplies concrete for bridges, culverts, walls and widening as well as paving.

"It's an efficient, high-production operation. We like it," says D. W. Winkelman, contractor.

This method cuts costs on small jobs, too. It's approved by 25 state highway departments. Write for bulletins today.



Central mixing plant located midway on job.



Slump, cylinder, beam and air test (above) all O.K.

with men who have basic operator skills, plus qualities that make them responsible and conscientious employees, the school is serving a useful purpose.

Before a man is accepted as a student, he must present several character references and agree to abide by a rigid code of conduct during his instruction. If a student's application is approved, he must take two mechanical aptitude tests prepared especially for the school by the Psychological Corp. of New York City. To date, an average of 6% have been turned down because their test grades did not indicate sufficient mechanical aptitude.

Standards Are High

Standards of conduct established by Shaw, who is also an Elder in the Mormon Church, are a lot rougher than those found at any college campus. Drunkenness, gambling, excessive profanity or malicious mischief are causes for immediate expulsion. Cleanliness, courtesy, respect for property, and the ability to get along with others are requirements for graduation.

Each day instructors turn in written reports on every student. In addition to evaluating his progress, or his grasp of such things as grading, the report lists such questions as: Does the student think and work independently? Does he use his time to good advantage? Does he work well with a group? Is he dependable and willing to assume responsibility?

Because he has screened his students carefully as to character and aptitude, and then put them through a rigorous four weeks of

(Continued on page 138)

Manufacturing Division, Maxon Construction Co., Inc.
718 Talbott Building, Dayton 2, Ohio

Send Me ☐ Paving on the Ohio Turnpike ☐ 8 Ways to Set Up For Central Mixing

Name _____

Firm _____

Street _____

City _____

**MAXON
DUMPCRETE**

Fastest from plant to pour



12½ AND 15-TON TRUCK CRANE—100 SERIES. These new AMERICAN truck cranes are completely engineered for crane-excavator service. You'll find them tops in low-cost efficiency with any front—crane, shovel, backhoe, dragline. A masterpiece of real versatility to let you handle more jobs faster! Move quickly and easily from job to job—travel over the highway at speeds up to 35 mph. Packed full of advance design features that add up to a real money-making machine!

AMERICAN HOIST

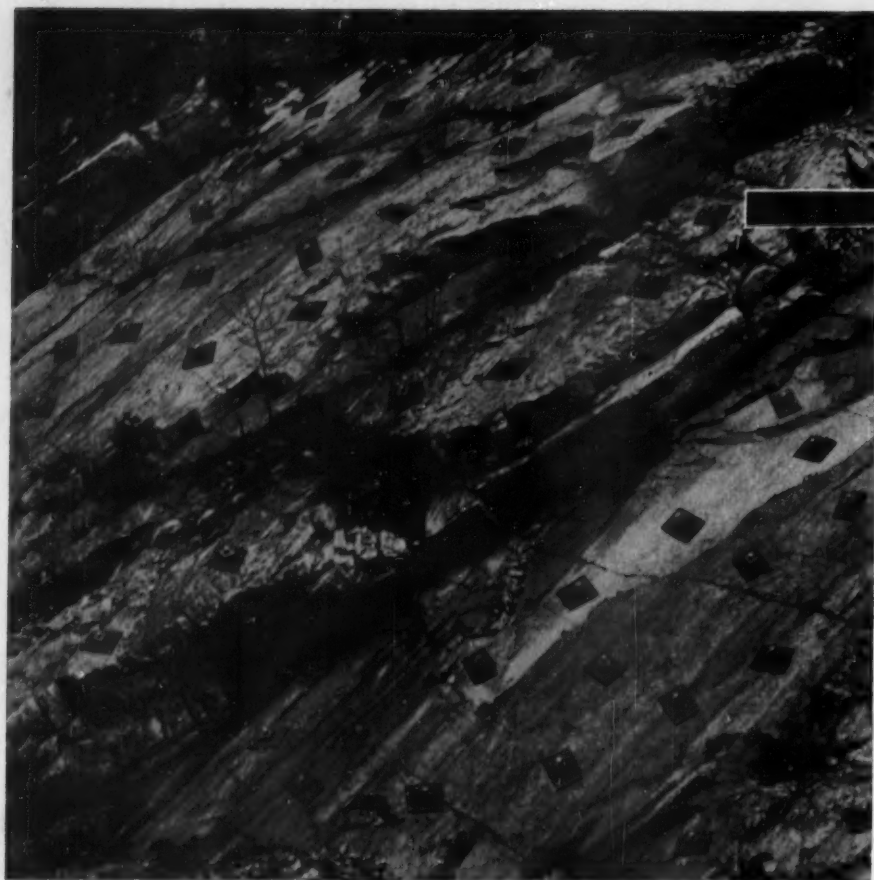
and Derrick Company

St. Paul 1, Minnesota

See next right hand page for more facts

(Advertisement)





Why keep your fingers crossed? Let anchor bolts hold the rock!

There's no need to trust to luck that serious rock slides won't happen. For today you can readily minimize danger from slides by using Bethlehem Rock Anchor Bolts.

Bethlehem Rock Anchor Bolts effectively lock together the stratified slabs of rock, stabilizing the slope so that disastrous rock slides are highly unlikely.

Bethlehem Rock Anchor Bolts are $2\frac{9}{32}$ in. in diameter, and come in lengths of from 2 ft to 10 ft, and longer. One end of the bolt has 5 in. of 1-in. rolled threads. The opposite end has a centered, forged slot, 6 in. long, to accommodate a steel wedge. The slot forms the equivalent of two half-rounds, and as none of the original cross-sectional area is lost during forging, the slotted portion is as strong as the shank of the bolt.

If you have a particularly troublesome rock

condition that has caused concern, tell us about it. We'll be pleased to have one of our engineers look into your problem, and offer recommendations. A call to the nearest Bethlehem office is all that's required.

How to Install Rock Anchor Bolts

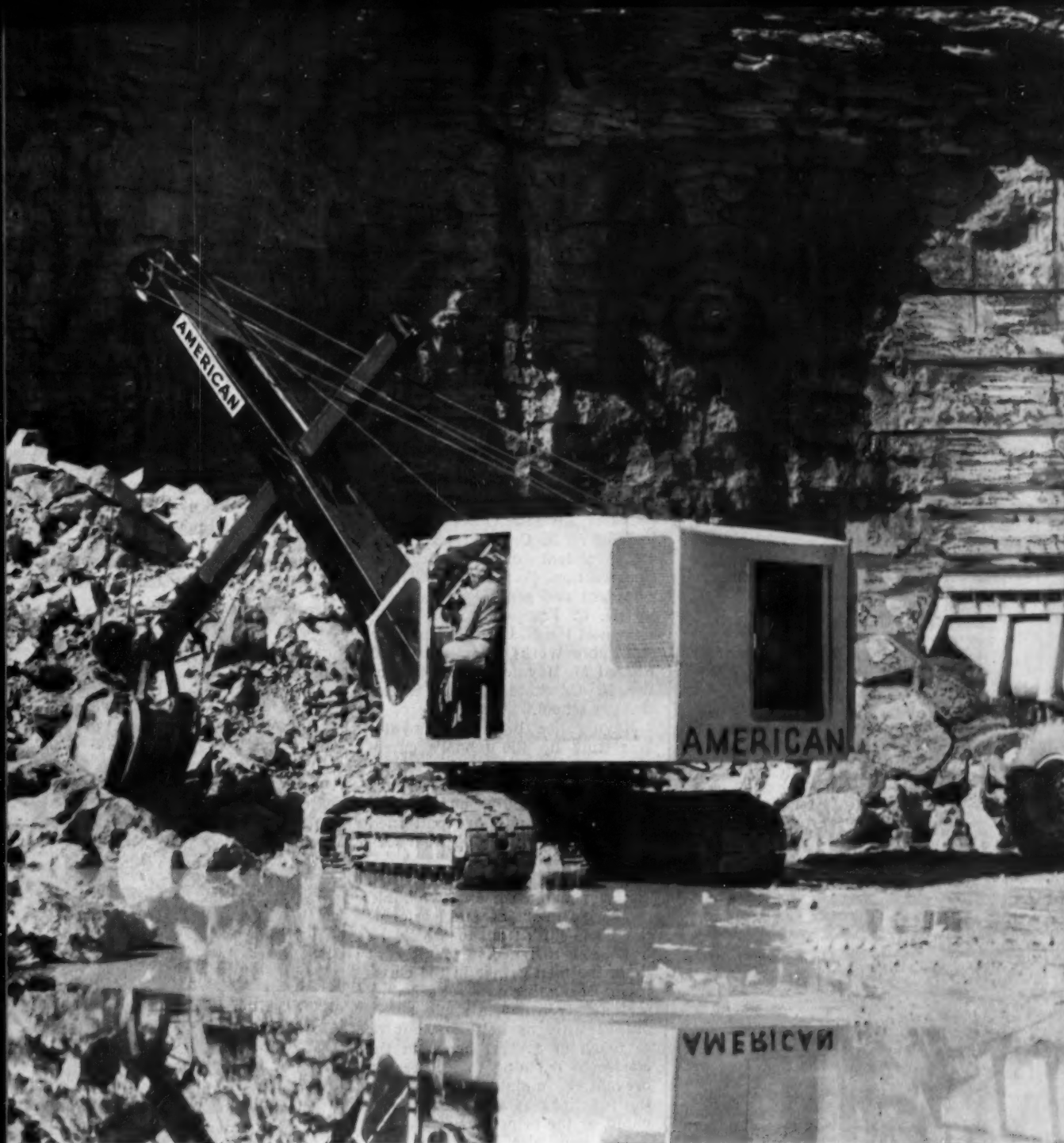
A $1\frac{1}{4}$ -in. hole is drilled to a depth of about 3 in. less than the length of the bolt. The bolt, with wedge started in slot, is placed wedge-first into hole. As the bolt is driven, the wedge is forced deep into the slot, spreading the bolt-ends so that they lock in the hole. Square plate washers or steel ties complete the assembly.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation, Export
Distributors: Bethlehem Steel Export Corporation

BETHLEHEM STEEL





STANDARD 3/4-YARD CRAWLER—200 SERIES. If top production at low initial cost is your requirement, here's the machine for you—the new AMERICAN 200 series crawler! It has the ruggedness for which AMERICAN is famous—which means years of trouble-free service. Simple direct mechanical linkages give accurate feel of the load and fast, smooth operation. The operator's station is "out front" for maximum vision. Here's a machine with ground-hugging stability for any service—a machine to do your jobs faster at lower cost!

AMERICAN HOIST

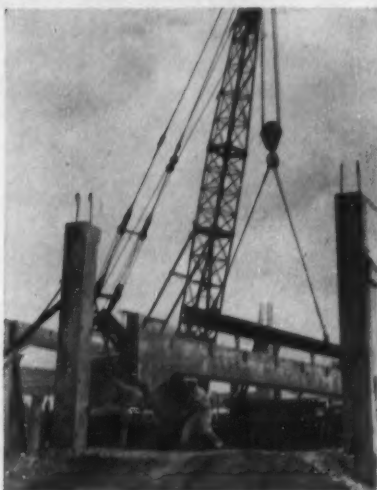
and Derrick Company

St. Paul 1, Minnesota

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(Advertisement)

Pre-cast



Secured by four 1 1/4" Richmond Screw Anchors, this 25 ton girder is lifted into place in first fully pre-cast, prefabricated building in the New England area, designed by Universal Engineering Corporation and built by the David Nassif Company, both of Boston. Placement of the 8-ton column on the left was accomplished with one 1 1/4" Richmond Screw Anchor imbedded vertically in the column head. Casting of all the pieces necessary for the complete construction of the 51,000 square foot building through production-line assembly of pre-cast walls, panels, girders and beams took only six weeks. In all concrete construction work, Richmond equipment guarantees speed and safety.



are a natural for all such prefabricated concrete assemblies.

For more information and your copy of Richmond's 1955 Catalogue showing the complete line of Richmond products applicable to all types of concrete construction, write: RICHMOND SCREW ANCHOR COMPANY, INC., 816 Liberty Ave., Brooklyn 8, N. Y. or 315 South 4th St., St. Joseph, Mo.



OPERATORS' SCHOOL . . . Continued from page 134

intensive training, Shaw feels that he can recommend to a contractor a man who has come through the course in good standing. Shaw believes his students eventually will prove of more value to contractors than men who have picked up their skills—and oftentimes bad habits—the hard way, in the field.

Contractors seem to agree, judging from the reports of such firms as J. A. Jones Construction Co., Blythe Bros., Rea Construction Co., and Nello L. Teer Co. These are among firms currently employing the school's graduates.

AGC Director Advises

Another ardent booster is Robert Patten, managing director of the Carolinas Branch of the AGC. Patten is a charter member of the board of advisors. Other members include W. T. Crowder, executive vice-president of the Crowder Construction Co.; W. C. Calton, president and general manager of the N. C. Equipment Co.; R. L. Brown of the N. C. State Highway and Public Works Commission; and Russell M. Haynie, Jr., director of the N. C. State College truck-drivers school.

Haynie has been instrumental in setting up the school's curriculum. Such things as the ratio of classroom to field work, the school's emphasis on safety, and its instructor techniques are patterned after the N. C. State College truck-drivers school.

The school day begins at 6:30 am. Each man makes his own bunk, cleans his quarters, and performs the clean-up detail to which he has been assigned. Promptly at 8 am the men gather in the classroom. Depending on a set schedule for any given day, a student may put as little as half an hour or as much as several hours in the classroom listening to lectures on preventive maintenance, safety, the functions of a particular machine, or the principles of grading.

The men also hear from specialists who are brought to the school as guest lecturers. A representative from the telephone company, for example, tells the students where they can expect to encounter underground cables. A fire-department representative discusses different types of fire and ways to combat them. Oil company people suggest proper lube schedules, emphasize the value of lubrication, and demonstrate proper procedures.

Students are assigned after-hour work from text books that include

"Moving the Earth" and "How to Operate Excavation Equipment" by Herbert L. Nichols, Jr.; "Foremanship and Accident Prevention in Construction" and "Accident Prevention on Surface Construction" by the American Mutual Liability Insurance Co.; technical manuals from the Power Crane and Shovel Assoc.; and operators' manuals issued by equipment manufacturers. In addition, movies, slides, and diagrams are used to illustrate classroom work.

When class room work is completed, the men gather in small groups with instructors around the machines they operate. Before any engine is turned over, students grease and oil the machines. A major consideration in evaluating a student is his skill in preventive maintenance, and how he performs such tasks as adjusting a cable, changing a blade, and making simple diagnoses of his machine's ills.

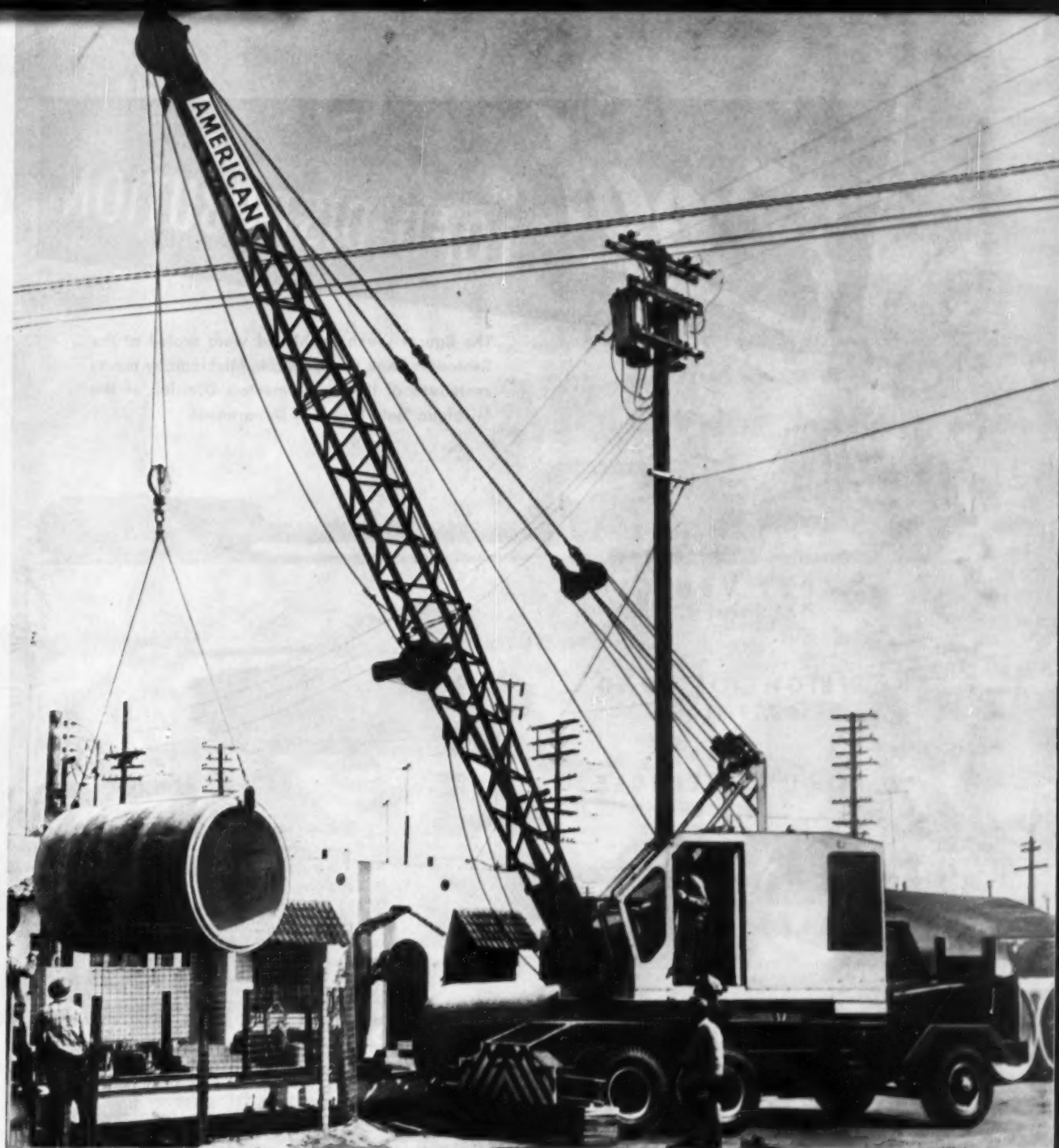


ANXIOUS STUDENTS check test grades. Before being accepted, applicants must give references and pass mechanical aptitude tests.

When the equipment is lubricated satisfactorily, it is moved out in careful order to various parts of the large campus. Sections are set aside for bulldozing, land clearing, push loading, spreading fill, grading, and dragline operations.

The 71-acre tract along the Catawba River, approximately 12 mi outside of Charlotte, has been an excellent practice ground. The terrain is varied enough to allow students to simulate practically any earthmoving job. The area is surrounded by several hundred acres of unused, wooded land that the school expects to lease for future instruction.

(Continued on page 142)



20-TON TRUCK CRANE—200 SERIES. Here's a real "all-around" crane—light in weight, yet with big capacity for its size. This new 200 series truck crane is designed for all fronts. Sensitive mechanical linkages make for outstanding accuracy, allowing the operator to inch loads into position. Its low center of gravity gives maximum stability with plenty of clearance. Engineered to withstand punishing service on all kinds of jobs, it features heat treated alloy steel gears and shafting and anti-friction bearings. You'll find this crane to be a real worker in the AMERICAN tradition!

AMERICAN HOIST

and Derrick Company

St. Paul 1, Minnesota

See next right hand page for more facts

(Advertisement)

Here is

Proof of LOAD DISTRIBUTION

The figures given in this ad were scaled at the Centerline Tank Plant, Detroit, Michigan by representatives of the Weightmasters Division of the Michigan State Highway Department.

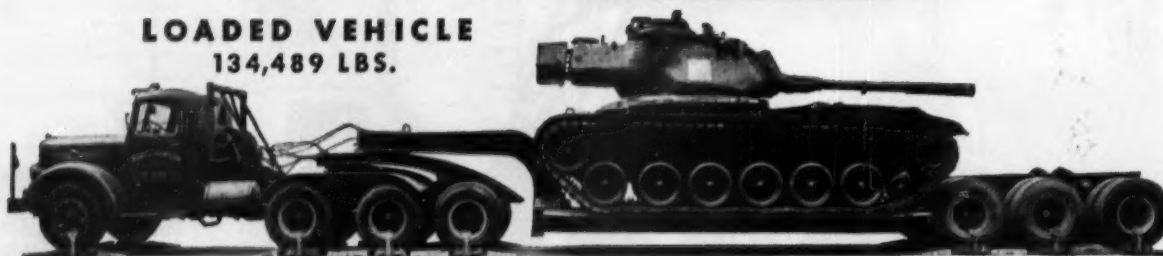


EMPTY VEHICLE
41,340 LBS.

WEIGHT OF LOAD
93,149 LBS.



LOADED VEHICLE
134,489 LBS.



	AXLE NO. 1	2	3	4	5	6	7	TOTAL WEIGHT
AXLE WEIGHT—LBS.								
EMPTY VEHICLE	81% 8220	37% 7660	36% 7440	24% 4920	22% 4420	20% 4450	20% 4230	30% 41,340
WEIGHT OF LOAD	19% 1820	63% 13100	64% 13040	76% 15270	78% 15870	80% 16909	80% 17140	70% 93,149
LOADED VEHICLE	10040	20760	20480	20190	20290	21359	21370	134,489
TIRE SIZE	10:00	10:00	10:00	10:00	11:00	11:00	11:00	
NO. TIRES	2	4	4	4	4	4	4	26
TOTAL TIRE WIDTH	20	40	40	40	44	44	44	
AXLE SPACING	1 to 2 11 ft. 6 in.	2 to 3 4 ft. 6 in.	3 to 4 4 ft. 0 in.	4 to 5 25 ft. 1 in.	5 to 6 4 ft. 1 in.	6 to 7 4 ft. 3 in.	FIRST TO LAST 53 ft. 7 in.	



THE TALBERT CONSTRUCTION EQUIPMENT CO., of Lyons, Illinois manufactures a complete line of low-bed trailers and dump semi-trailers

THE TALBERT-WAY IS THE EASY WAY



HEAVY-DUTY $\frac{3}{4}$ -YARD CRAWLER—300 SERIES. Big extra-wide crawler pads, ruggedly built crawler frame and massive cast steel carbody for ground-hugging stability! Anti-friction bearings at every vital point for smooth, profitable operation. Toughest travel machinery in the field. Whether your need is for clamshell, dragline, shovel, backhoe or crane work, here's the heavy-duty crane-excavator that combines easy, accurate control with big-payload power!

25-TON TRUCK CRANE—300 SERIES. A versatile, over-the-road machine you can move quickly and easily from job to job! Fast boom length changes with pin-connected boom sections. All fronts are available and easily changed in the field. Upper deck machinery arrangement similar to that which has made the AMERICAN 300 series crawler famous. Operators say the 300 series truck crane is by far the easiest and smoothest operating machine they have ever used.



AMERICAN HOIST

and Derrick Company

St. Paul 1, Minnesota

See next right hand page for more facts

(Advertisement)

OPERATORS' SCHOOL . . . Continued from page 138

Students spend the remainder of the day, except for a 30-min lunch break, in the field. While a two-man team operates a scraper and a push-loading crawler, other students in the small group assigned to each machine listen to the instructor's evaluation of their work. Time sheets on each student show how much time he has spent operating a machine and when he is again due to get behind the controls. Men specialize in the operation of one or two rigs during their courses, and spend a considerable

amount of time actually on the machine of their choice.

A strict requirement for graduation is that a man work a specified number of hours on his machine. Should the weather be extremely bad, or should a man be ill for a few days, he must make up his time on Saturday or Sunday.

Several times during the course the men visit projects actually under construction. During these field trips they get a chance to operate various makes of equipment and to evaluate actual construc-

tion procedures in the light of what they have been taught at school. The next morning they give their impressions of what they saw the previous day.

At the end of the course, a formal graduation ceremony is held. But graduation day at the National School of Heavy Equipment Operation also serves a useful purpose. Contractors from throughout the South attend the ceremonies. They see the students cleaning and lubricating the rigs they have worked on during the course.

When this is finished, the men move out their rigs and, under the watchful eyes of prospective employers, put the earthmovers through their paces. After the ceremonies are completed and the diplomas awarded, a social hour is held at which contractors may talk to men who caught their attention during the demonstration. Several men have got jobs on the spot, and others have used this initial contact to obtain a job afterwards.

Men Learn Responsibility

Shaw believes he is turning out a new kind of equipment operator. He strives to develop men who have the aptitude and attitude of a good employee. A graduate may need a lot more work before he is a finished operator, but a contractor can be reasonably sure he is hiring a man who has the basic skills, a sense of responsibility toward the property of others, and a genuine pride in his work. A contractor could do a lot worse than entrust his expensive equipment to men with these qualities.



FACTORY TO YOU

No middleman involved when you buy a McCarter Asphalt Plant.

This factory-to-you plan guarantees you the most for your money in equipment . . . the most satisfactory service.

Designed by our own engineers, built in our own factory, serviced directly by our factory experts.

Our sales engineers will be glad to counsel with you.

REPAIRS AND MODERNIZING

We specialize in remodeling old plants for better production and more efficient operation.



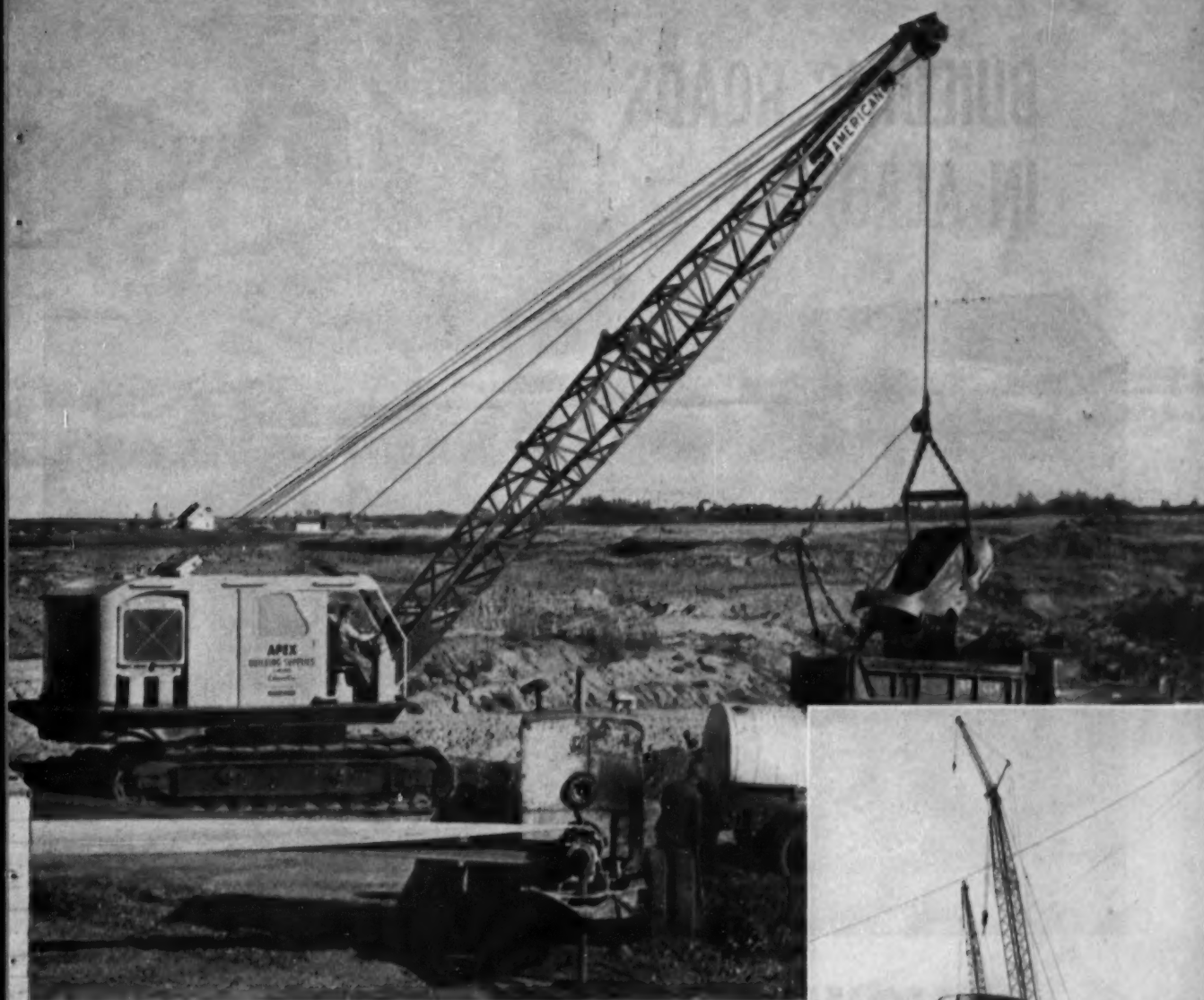
IRON WORKS, INC. NORRISTOWN, PA.

buy and use

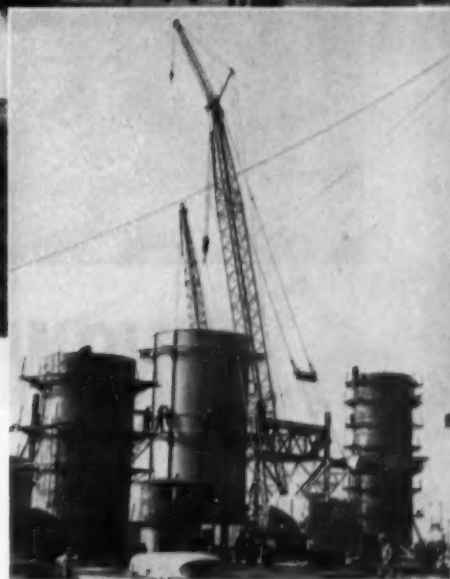


**CHRISTMAS
SEALS**

fight tuberculosis



FAMOUS 700 SERIES. Crawler and rubber mounted 2-yard dragline, 1½-yard rock shovel and backhoe. Powerful 50-ton steel erectors crane, 45-ton truck crane. High operating speed provided with famous AMERICAN air controls, wide tandem band clutches and smartly-engineered shaft assembly. For simple maintenance and easy accessibility, you'll find the 700 series crane-excavators superior to any machine in the field. You'll get capacity loads on every pass with this great machine—now proving its superiority on jobs of all kinds!



AMERICAN HOIST and Derrick Company

St. Paul 1, Minnesota

(Advertisement)

SEND COUPON TODAY FOR MORE DETAILS

**AMERICAN HOIST AND DERRICK COMPANY,
ST. PAUL 1, MINNESOTA**

Please send me full details on your expanded line of Crane-Excavators. I am particularly interested in _____ ½-Yard Crawler _____ 12½-15-Ton Truck Cranes _____ Standard _____ ¼-Yard Crawler _____ 20-Ton Truck Crane _____ 300 Series Crane-Excavators _____ 700 Series Crane-Excavators.

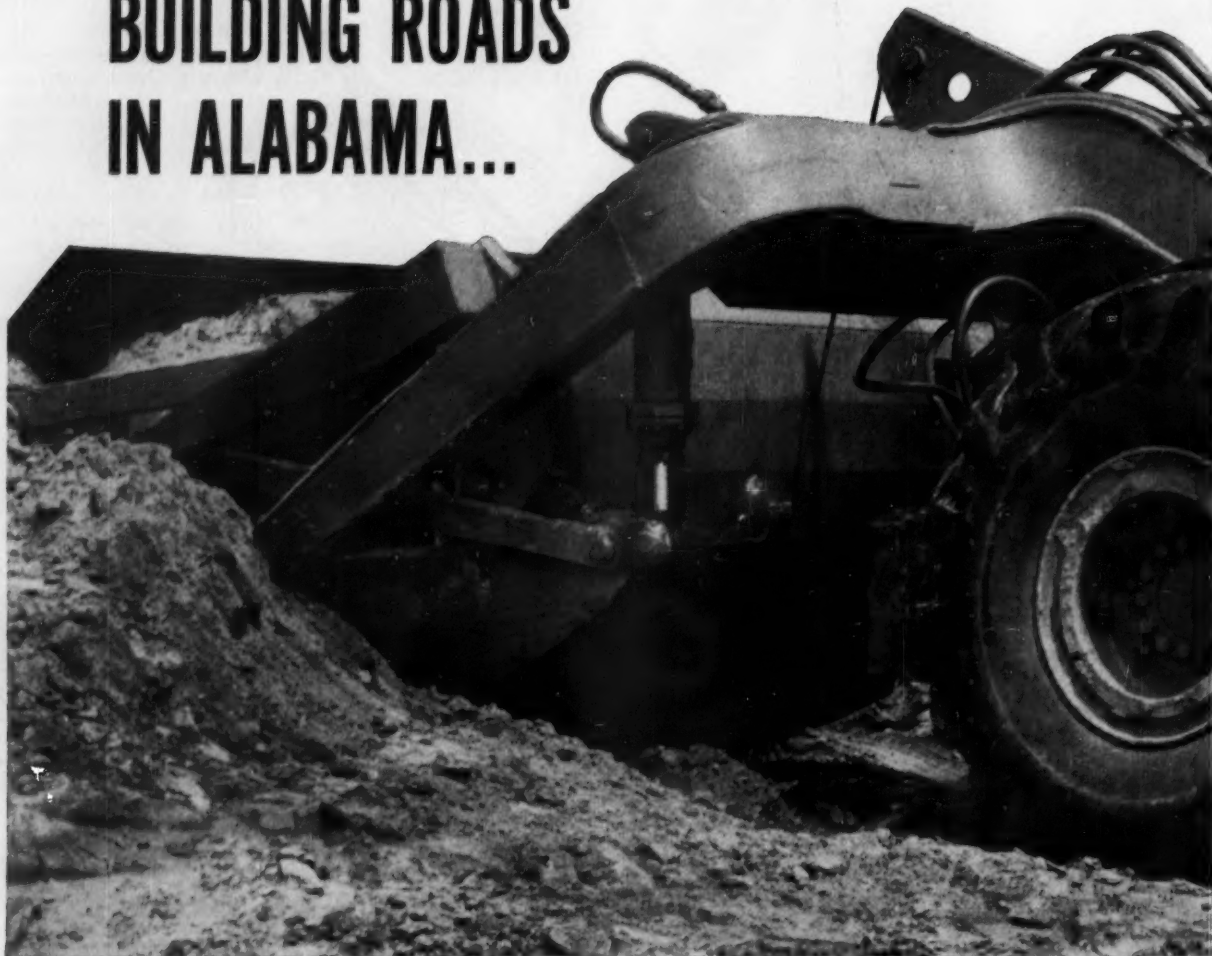
Name _____

Company _____

Address _____

City _____ State _____

BUILDING ROADS IN ALABAMA...



"NO MORE DAMP ROT OF CORD



says J. W. LAIDLAW,

owner, Laidlaw Contracting Company, Mobile, Alabama

"We specialize in heavy construction—mostly building roads and bridges. Our 50 trucks and 20 pieces of heavy equipment roll 8 hours a day in all kinds of weather. Loads on the earth movers run up to 25 tons. Roads—if any—are rough. Tires have to be able to take it. Cord rot was once a big problem—we'd snag a tire on a wet-road job, and the cord would rot in no time. The tire was usually ruined for good.

"We started using nylon cord tires over a year ago to get longer service and stop damp rot of cord. We now have nylons on almost all our equip-

YOU'LL FIND NYLON IN PASSENGER-CAR TIRES, TOO! Impact-absorbing nylon cords mean extra protection against blowouts . . . greater safety on any road.



SINCE WE SWITCHED TO NYLON''

ment. So far we haven't had a single case of cord rot! What's more, tough nylon cords stand up under repeated heavy impacts from rocks and stumps. All our replacements are nylons, and we're specifying them on all new equipment. We're well satisfied with nylon cord tires. I've had a set installed on my own car, too!"

Lower Cost per Mile

Actual road experience proves nylon offers extra protection against tire failure. Truck users' reports show nylon cord tires mean fewer road delays, more mileage, more retreads—lower cost per mile.

Prove to yourself that nylon cord truck tires give substantially lower cost per mile. Ask your dealer about nylon cord truck tires today. (Du Pont makes the tough nylon yarns, does not produce tires.)

**DU PONT NYLON
FOR TIRE CORD**



REG. U. S. PAT. OFF.

**BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY**

FREE BOOKLET on nylon tires—write for your copy. Textile Fibers Dept., Room 2494A, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Del.



1 NUMBERING RAILS on rack and feeder is preliminary to start of Matisa-Schlatter rail-welding process. Before rails are fed into the welder, workmen also clean the rail ends and electrode contact surfaces with portable grinders. Equipment is housed in three 50-ft boxcars which can be spotted on a convenient side-track and operated as an assembly line.



4 UPSET METAL shows at junction of two rails immediately after the weld is completed in the Matisa-Schlatter machine.



5 CUTTING BLADES activated by hydraulic pressure shear off upset metal on base and head of rail in first car.



6 GRINDING takes place in the second of the three cars in the Matisa-Schlatter setup. This machine grinds base of rail.

Machine Welds 1,440-Ft. Rails

CONTINUOUS WELDED RAIL is replacing conventional 39-ft rails in three sections of the Santa Fe Railway system. The railroad is using the Matisa-Schlatter electric butt-welding process, developed in Switzerland, to fabricate strings of rail 1,440 ft—or approximately $\frac{1}{4}$ mi—in length.

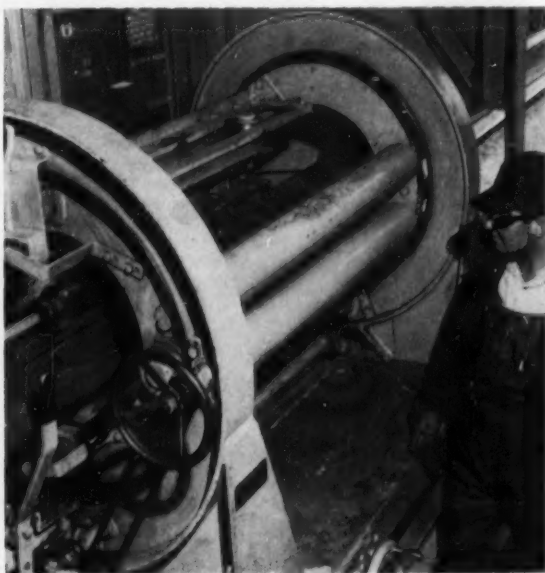
The process was used for the first time at Santa Fe's Abajo yard in Albuquerque, N.M., to weld about 27 mi of rail for the main line between Rosario and Bernalillo. Cost of this job was about \$1.4 million for materials, welding and labor.



2 LINING THEM UP in the machine, the operator gets set to start the weld. Machine holds rail in place with a pressure of 100 tons and exerts a pressure of 50 tons on rail ends.



3 WELDING goes fast. Machine can make about 15 welds an hour. Welding car also contains air compressor and receiver and water-cooling unit to cool electrodes.



7 RAIL-HEAD CONTOUR is ground in this machine. Grinding car also contains a winch for moving rails, a monorail and hoist for handling rail clamp and a portable rail saw.



8 MAGNAFLUX TEST determines soundness of the weld. One workman applies electrical contact prods to the rail, while man at the left sprays iron dust on the joint with powder blower.

In addition to the Rosario-Bernalillo mileage, the railway will lay down about 7½ mi of welded rail near Waynoka, Okla., and about 28 mi between Knox and Edelstein, Ill.

The Matisa-Schlatter machine is capable of welding rail weighing up to 155 lb per yd. It has a maximum capacity of about 15 welds per hr. Equipment for welding, grinding and testing is housed in three 50-ft boxcars that are operated in assembly-line fashion.

From a stockpile of new 39-ft rails located near

the forward end of the first car, the rail is fed through the three cars. It then goes directly on to a train of 31 flatcars, with a capacity of 12 strings of continuous 1,440-ft rail, to be hauled to the site where it will be laid.

The Santa Fe reports that service tests of rail welded by the acetylene gas process have proved the practicability of welding as a maintenance-saving proposition. Fred G. Gurley, president of the railroad, described the process as "something entirely new to American railroading."

GET MORE WORK

FROM SHOVELS, CRANES, DRAGLINES

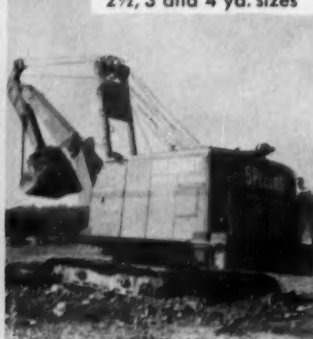
LINK-BELT SPEEDER
1/2, 3/4, 2 1/2 yd. sizes



KOEHRLING
1/2, 3/4, 1 1/2, 2 1/2 yd. sizes



BUCYRUS-ERIE
3/8, 1/2, 3/4, 1, 1 1/2, 2,
2 1/2, 3 and 4 yd. sizes



GARWOOD
3/4 yd. size



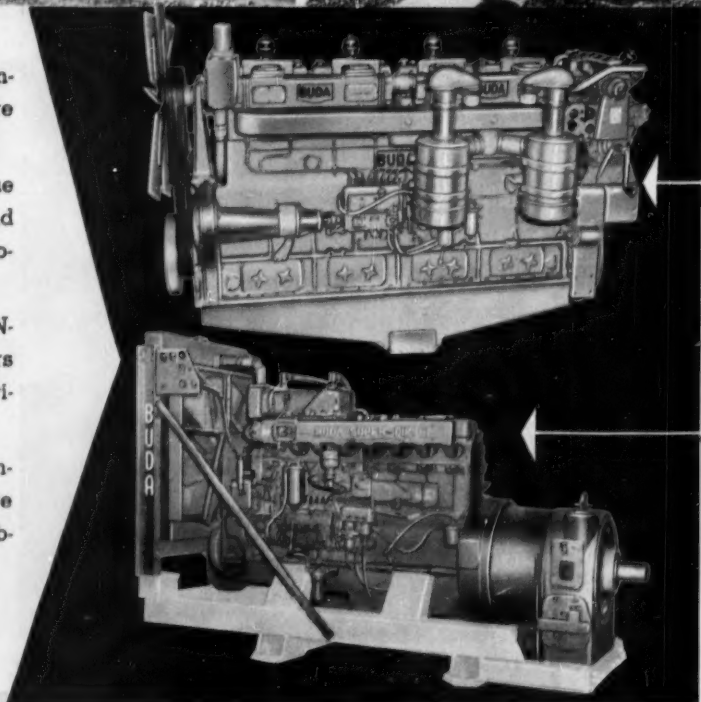
Specify or install an Allis-Chalmers Diesel or gasoline engine in any of these shovels, cranes or draglines and insure your investment in your machine.

BIG, RUGGED WORKHORSE ENGINES with high torque in the normal operating range. They have the power and stamina to give you smoother, faster cycles for greater production, year in and year out, on any kind of job.

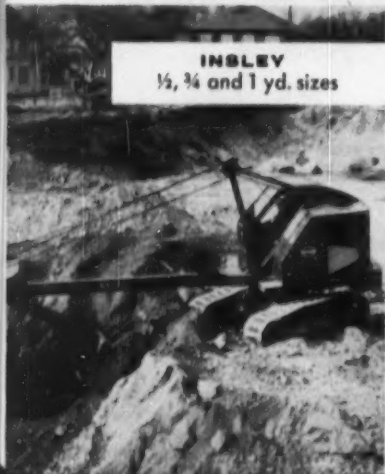
SIMPLE IN DESIGN... EASY TO SERVICE AND MAINTAIN—smokeless, quiet and smooth-running, Allis-Chalmers engines are packed with features that will pay you dividends in low cost, high production operation.

FOR EYE OPENING FACTS on how Allis-Chalmers engines make shovels, cranes and draglines more productive at less cost, see your nearby Buda Division Engine Distributor soon.

BUDA DIVISION • HARVEY, ILLINOIS



INSLEY
1/2, 3/4 and 1 yd. sizes



AMERICAN
3/4 and 1 1/2 yd. sizes

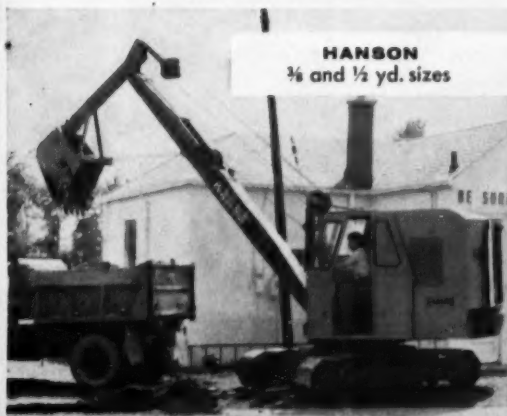


MARION
3/4, 1, 2, 2 1/2 yd. sizes

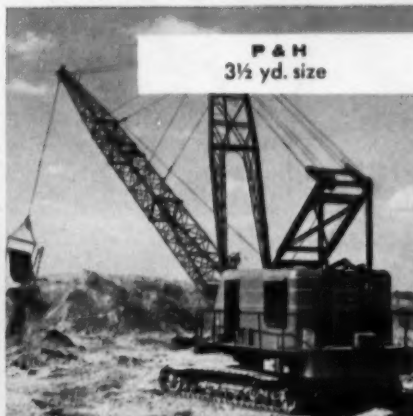


...at less cost

POWERED BY ALLIS-CHALMERS ENGINES



HANSON
¾ and ½ yd. sizes



P & H
3½ yd. size



QUICK-WAY
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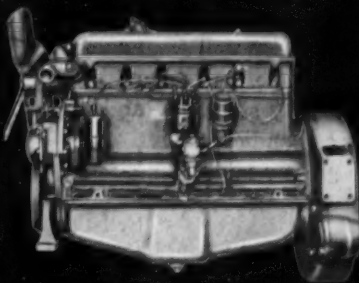
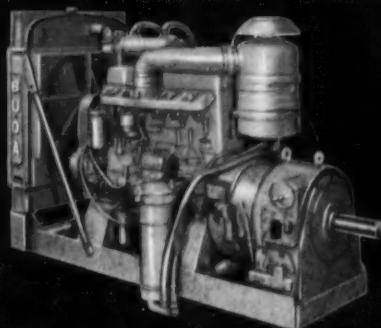
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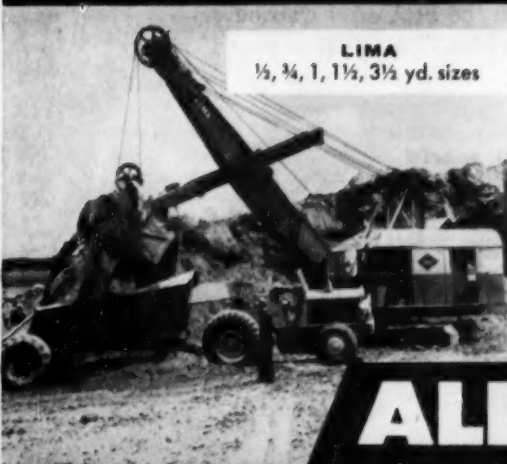
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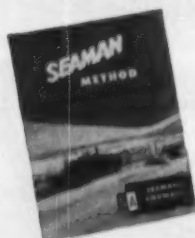


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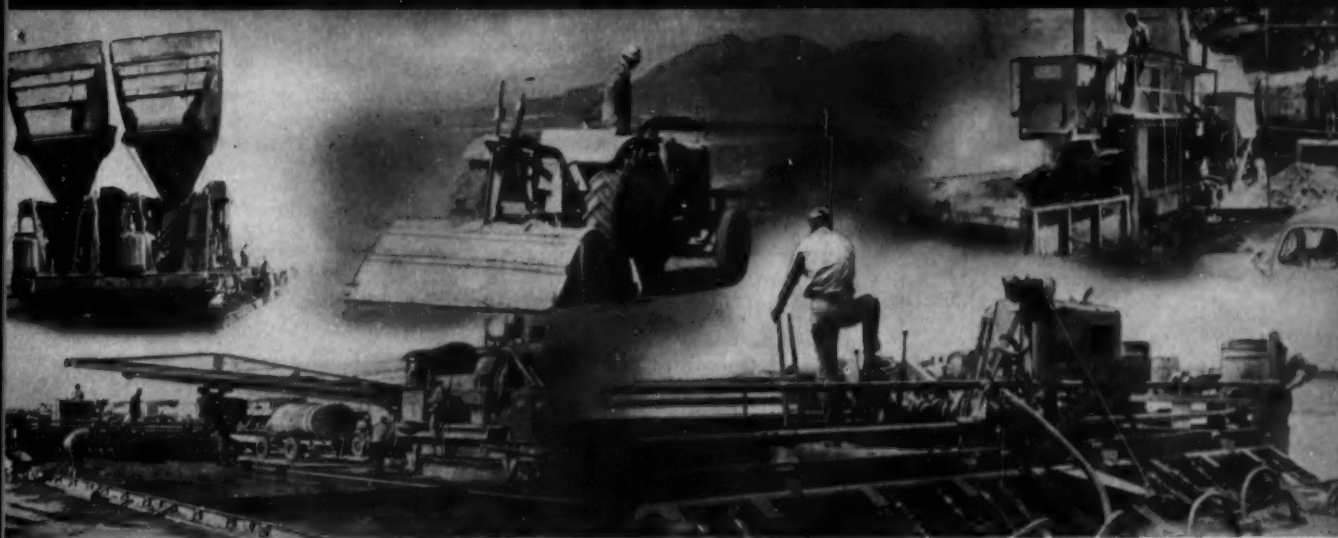


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PAVING...HOW TO GET THE BEST RESULTS



3. Bituminous Penetration Macadam

PENETRATION MACADAM is one of the strongest and most durable of pavements. Usually contractors employ modern equipment and rapid construction procedures to put down a penetration macadam base or surface. But hand labor can achieve almost the same results. Many miles have been built by hand labor under the most adverse conditions. Sometimes such surfaces were not very smooth, but they were completely bonded and served satisfactorily to carry heavy military traffic with a minimum of maintenance.

To construct penetration macadam, a layer of coarse aggregate is spread, then penetrated with asphalt. Next, the voids in the coarse aggregate are partially filled with an intermediate size, and a second application of asphalt is put down with hot asphalt cement. Two heavy applications usually are enough. With lighter asphalt products, several applications over successively smaller sized aggregate will produce a well-keyed layer.

The size of the aggregate limits the thickness of a layer. Generally, a layer's thickness should not exceed $1\frac{1}{2}$ times the diameter of the largest coarse particles. Early

By **BERNARD E. GRAY**
Former President, The Asphalt Institute

hot penetration macadam surface courses were 3 in. thick; penetration bases were 3 to 4 in. thick. With increased use of more liquid asphalt materials—such as emulsified and cut-back products—it is possible to use smaller sized aggregate in thicknesses of 1 to 2 in. Where bases more than 4 in. thick are needed, multiple layers are used.

Penetration macadam is a high-type pavement. It was first developed and used in areas where excellent stone—such as traprock and granite—was available. At one time New York had nearly 14,000 mi of penetration macadam surfaces. Massachusetts and Oregon also used it extensively for wearing surfaces. Massachusetts developed an open texture finish that provided effective traction during sleet storms.

When balloon tires became common, these coarse-textured surfaces often produced a disagreeable rumble. Many of the older roads had $\frac{1}{2}$ - to $\frac{3}{4}$ - in. crowns, a carry-over from earlier waterbound macadam design. They still were

strong, but often also very rough. Gradually they were resurfaced. Today they are the foundations under possibly as much as 50,000 mi of primary highways.

Penetration macadam still is used as a surface course in limited areas of the U.S., but its principal use now is for foundations. On the New Jersey Turnpike, for example, the base courses are asphalt penetration macadam. There are now many instances in new work where the sub-base is gravel, the base is penetration macadam, and the wearing surface is hot asphalt plant-mix. The dual highway bypass around Boston is of this design. The combination makes for economical use of full quarry output, and construction is expedited.

Construction

Three principal types of penetration macadam are in common use. 1) Hot asphalt penetration for both surfaces and base courses; 2) emulsified asphalt penetration, mostly for wearing courses; 3) cut-back asphalt penetration, also principally for wearing courses. The gradation of aggregate, the kind of asphaltic materials, and the quantities usually required for each type are shown in the tables.

Table 1 . . . Asphalt Macadam Surface Course — Hot Penetration Method

(Usual thickness range 2½ to 3 in.)				APPROXIMATE QUANTITIES FOR 2½-IN. COMPACTED THICKNESS		
GRADING REQUIREMENTS FOR AGGREGATE						
Aggregate Total Passing	Coarse % by weight	Intermediate % by weight	Fine % by weight	Materials	Per Sq Yd	Per Mi 1 Ft Wide
2½-in. sieve	100	—	—	Coarse aggregate No. 3	200.0 lb	58.7 tons
2-in. "	90-100	—	—	Intermediate aggregate No. 67	10.0 "	2.9 "
1½-in. "	35-70	—	—	Fine aggregate No. 78	30.0 "	8.8 "
1-in. "	0-15	100	—	Asphalt cement	2.4 gal	1,407.0 gal
¾-in. "	—	90-100	100	APPROXIMATE QUANTITIES FOR 3-IN. COMPACTED THICKNESS		
½-in. "	0.5	—	90-100	Materials	Per Sq Yd	Per Mi 1 Ft Wide
¾-in. "	—	20-55	40-75	Coarse aggregate	261.0 lb	76.6 tons
No. 4 "	—	0-10	5-25	Cover aggregate	25.0 "	7.3 "
No. 8 "	—	0-5	0-5	Asphalt cement	1.65 gal	968.0 gal

Table 2 . . . Modified Penetration Surface Course With Emulsified Asphalt

(Usual thickness range ¾ to 1½ in.)
Table of Quantities (per sq yd)

Compacted Thickness (inches)	MC-0 or RS-1 Prime Coat (Gal)	Coarse Aggregate Size	Coarse Aggregate Lb	RS-1 First Pen. Appl.	Intermediate Aggregate Size	Intermediate Aggregate Lb	RS-1 Second Pen. Appl.	Fine Aggregate No. 4 to 16 "g (Lb)	RS-1 Seal Coat Appl.	Cover Aggregate No. 4 to No. 80	Total Aggregate Lb (Min)	Total Emulsified Asphalt (Min)
1½	0.20 to 0.30	1½ in. to ¾ in. *a	110 to 130	0.50 to 0.60 Gal	½ in. to No. 8 *e	20 to 30	0.60 to 0.70 Gal	10 to 15	0.25 to 0.35 Gal	8 to 12	150	1.55 Gal
1¼	0.20 to 0.30	1 in. to ¾ in. *b	75 to 90	0.40 to 0.50 Gal	¾ in. to No. 8 *f	15 to 25	0.50 to 0.60 Gal	10 to 15	0.25 to 0.35 Gal	8 to 12	125	1.35 Gal
1	0.20 to 0.30	¾ in. to ¾ in. *c	50 to 60	0.30 to 0.35 Gal	¾ in. to No. 8 *f	15 to 25	0.45 to 0.50 Gal	10 to 15	0.25 to 0.35 Gal	8 to 12	100	1.20 Gal
¾	0.20 to 0.30	¾ in. to No. 4 *d	35 to 45	0.30 to 0.35 Gal	No. 4 to No. 16 *g	15 to 25	0.35 to 0.50 Gal	10 to 15	0.25 to 0.35 Gal	8 to 12	75	1.10 Gal

*Not more than 10% of the aggregate shall be either coarser or finer than the maximum or minimum sizes indicated. Weight of aggregate assumed to be 2,550 lb per cu. yd. If slag is used, the quantity shall be reduced in the ratio of the weight of the slag per cu. yd. to 2,550. Any deficiency in the quantity of emulsified asphalt in any application shall be added to the next subsequent application but overage in any application shall not be deducted from subsequent applications. Note — With limestone, or dusty aggregate, increased efficiency of penetration may be obtained by sprinkling with water just ahead of each emulsion application.

APPROXIMATE QUANTITIES FOR 1½-IN. COMPACTED THICKNESS

Materials	Per Sq Yd	Per Mi 1 Ft Wide
Coarse aggregate	112.0 lb	32.9 tons
Intermediate aggregate	20.0 "	5.9 "
Fine aggregate	10.0 "	2.9 "
Cover aggregate	8.0 "	2.3 "
Emulsified asphalt (RS-1)	1.7 gal	998 gal

Table 3 . . . Modified Penetration Surface Course With Cutback Asphalt

(Usual thickness range 1 to 2 in.)
GRADING REQUIREMENTS FOR AGGREGATE

Aggregate Total Passing	Coarse Sizes % by weight	Fine Aggregate % by weight
2-in. sieve	100	—
1½-in. "	90-100	100
1-in. "	20-55	90-100
¾-in. "	0-15	40-75
½-in. "	—	15-35
¾-in. "	0-5	0-15

No. 4 sieve — 0-5 5-25
No. 8 " — — 0-5

APPROXIMATE QUANTITIES FOR 1½-IN. COMPACTED THICKNESS

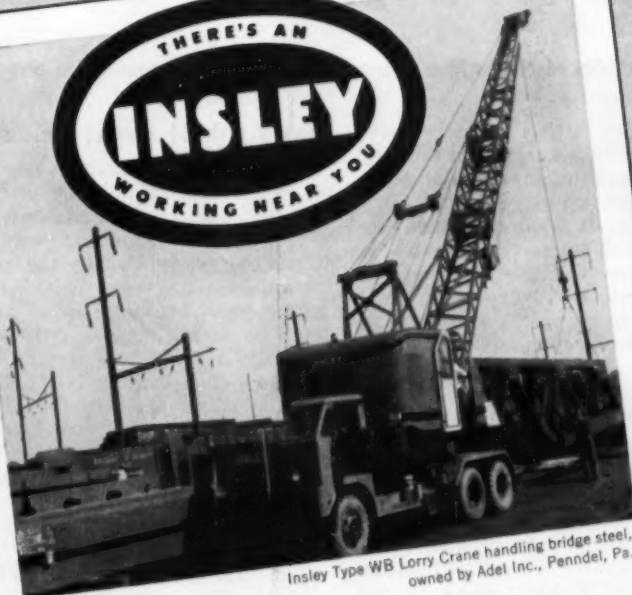
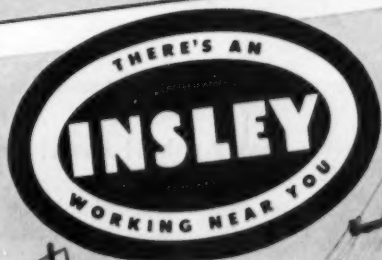
Materials	Per Sq Yd	Per Mi 1 Ft Wide
Coarse aggregate No. 4	128.0 lb	37.7 tons
Fine aggregate No. 78	15.0 "	4.3 "
Asphalt primer MC-0	0.25 gal	147.0 gal
Asphalt binder RC-5	1.1 "	649.0 "

Quality work results, as always, from careful attention to uniformity. The aggregate should be uniform in size and of such grading that the surface voids are uniform. Aggregate may be either crushed rock or crushed slag, but it should be hard and tough, capable of

withstanding heavy rollers. Compaction to the point of interlock should be possible without much breaking or chipping of the particles. It is the keying together of strong fragments that is the secret of successful construction.

The aggregate should be free of

dust. Any elongated, "slabby" pieces should be removed. As the aggregate is spread, a man should spot and rake out any off-size material before the first application of asphalt. A little hand labor of this sort can greatly improve the final results. (Continued on page 154)



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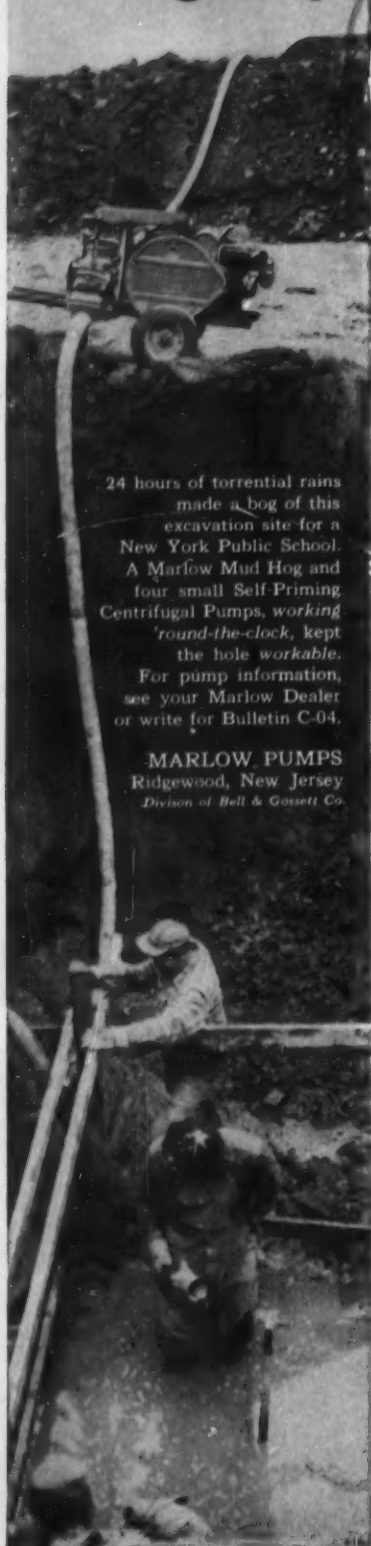
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PENETRATION MACADAM . . .

Continued from page 152

As with other asphalt work, warm weather during and for several weeks after construction leads to superior results. Rolling is very important. It is almost impossible to over-roll where the aggregate is of superior quality. Back-rolling for as long as 10 days after final seal coat produces the consolidation and set that contribute so much to ultimate durability.

Equipment

The first penetration macadam surfaces were hand-poured from pouring pots of several gallons capacity with wide slotted nozzles. The first application usually was at a 45-deg angle with center line; the second, at right angles to the first. A trained crew could achieve a remarkable uniformity with these methods.

Today, of course, distributors usually apply the asphalt. This piece of equipment is very important; it should be checked and re-checked for uniformity of operation. Pressures of 40 to 60 psi are desirable to insure the penetration of the asphalt to the full depth of the aggregate. And the distributor should have a drip-pan so that no streaking of asphalt can occur when the spray bar is shut off.

Aggregate spreaders often work in tandem to gain more uniformity in cross-section. Rollers should be heavy, capable of applying at least 300 lb pressure per lineal inch width of rear wheel. On very tough traprock, rollers weighing 15 tons have been used to good advantage. The modern three-axle roller has proved effective. Mechanical vibrators also are useful for the first compaction of the coarse aggregate.

Aggregate

Aggregate should be graded so that the surface voids are large and uniform when it is fully keyed and compacted to the maximum degree possible. If the surface voids are not large and uniform, then the aggregate either is not properly graded or it is so soft that it has been crushed by the roller. In either case, it should be rejected.

Power or hand brooms are useful for sweeping loose aggregate from the surface before the application of the seal coat. Light brooming of the surface during back-rolling also is helpful. Final brooming to remove all cover aggregate at the completion of work

avoids subjecting traffic to unnecessary annoyance.

Hot Asphalt Penetration

Penetration macadam surfaces or base courses should be placed on well-compacted foundations of gravel, traffic-bound or water-bound macadam. Usually the base or sub-base has been primed—if for no other reason than to preserve it during construction—but priming is not necessary. The quantity of asphalt to be applied is sufficient to preserve the layer through all weather conditions. Before spreading the coarse aggregate, well-compacted shoulders should be constructed to provide full lateral support during first compaction of the aggregate.

The first application of hot asphalt cement is made after thorough rolling and checking cross-section for crown. For surface course construction, asphalt is applied at the rate of 2 gal per sq yd; for base-course layers, the rate is about 1½ gal per sq yd. The asphalt should be hot—between 275 and 350 deg—and under pressure of about 50 psi so that it will penetrate to the full depth of the coarse aggregate layer. Building paper, spread transversely across the roadway before starting each distributor load, will prevent overlap.

Intermediate size aggregate next is spread. Just enough should be used to prevent picking up under the rollers; seven to 10 lb per sq yd usually is sufficient. Rolling immediately while the asphalt still is warm insures further keying and compaction. Rolling should be continued until the surface no longer moves under the roller.

The pavement then should be swept clean of any loose aggregate before the second application of hot asphalt cement. The rate of application usually is the same for either surface course or base course construction—0.4 gal per sq yd. Finally, the fine aggregate is applied, rolled, and broomed until a uniform surface is obtained. Back-rolling should continue for 10 days. In general, one roller can compact 100 sq yd of 2½-in. surface course in an hour.

Emulsified Asphalt

Penetration

With emulsified asphalt, layers usually are thinner, and different aggregates—such as crushed gravel or very angular uncrushed gravel

(Continued on page 157)



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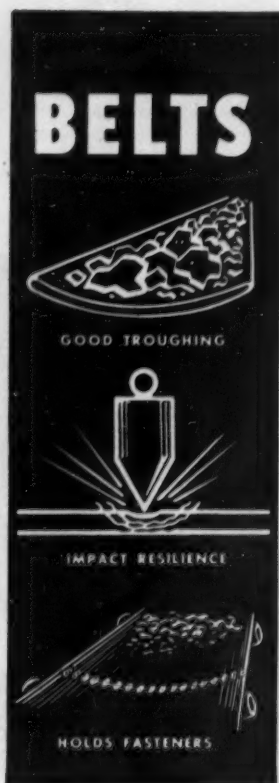
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PENETRATION MACADAM . . .

Continued from page 154

—may be used. The thinner asphalt films make it possible to increase the number of asphalt applications, each followed by successively smaller size aggregate to produce a well-bonded layer, thoroughly keyed by the wedging of the aggregate particles.

The well-compacted base course should be primed with from 0.2 to 0.3 gal of RS-1 grade asphalt. If it is dry and dusty, the base should first be wet with from 0.15 to 0.35 gal of water per sq yd. The coarse aggregate then is spread to the required depth, shaped to cross-section by blade graders, and rolled. Because of the thinner courses, rollers need not weigh more than eight tons. A weight of 200 lb per lineal inch width of rear wheel is sufficient.

First Application

The first application of emulsified asphalt should be 0.5 to 0.6 gal per sq yd for a 1½-in. compacted thickness. The screens in the distribution lines of the pressure distributor should be removed to prevent premature "breaking." (At the end of each day's work, the distribution system should be filled with kerosene to prevent clogging. The kerosene, of course, must be removed before filling the distributor with its next load of asphalt.)

Only enough intermediate size aggregate should be spread to provide keying. It is not desirable to fill the voids completely in the coarse aggregate. Use of a broom-drag—not less than 7x12 ft in size—gives uniformity. Rolling and brooming follow.

Additional applications of aggregate and asphalt should continue until a uniformly compacted layer is obtained. Then, sufficient time should elapse before application of the final seal-coat to assure complete breaking and set of the emulsion. In good drying weather at least 24 hr are required.

The character of the small-size seal-coat cover aggregate determines when it should be applied. Stone chips or pea gravel should be applied immediately, while the emulsion still is brown in color. Sand should be applied just as the emulsion begins to turn black. It is important never to delay the application of the cover so long that the emulsified asphalt has broken completely. That point is when the asphalt is black through

(Continued on page 158)

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PENETRATION MACADAM . . .

Continued from page 157

the full thickness of the film. Rolling and brooming should continue until a uniform surface is obtained. Pneumatic-tired rollers help compaction, particularly of the outer edges of the pavement.

Cut-Back Asphalt Penetration

As with emulsified asphalt, aggregate may be either crushed or uncrushed gravel of good angular quality. It is essential to regulate the size of the aggregate to the final thickness. Compacted thickness usually is 2 in., or less.

Untreated base courses should be primed with MC-O at the rate of 0.2 to 0.3 gal per sq yd. When the base cures, coarse aggregate is spread, usually with blade graders. The aggregate should be rolled once. Eight-ton rollers are adequate because not more than 200 lb per inch width of rear wheel is necessary. The first application of cut-back asphalt RC-5 should be made at a temperature of 200 to 275 deg. The rates of applications are:

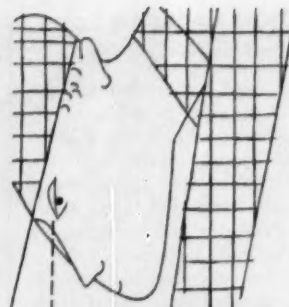
Finished Thickness	Gal. per sq yd
1 in.	0.4 to 0.6
1 1/2 in.	0.6 to 0.9
2 in.	0.8 to 1.2

Fine aggregate is spread in just sufficient amount to prevent pick-up under the roller. Then, additional aggregate, followed by brooming and rolling, will thoroughly fill and key together the layer. The RC-5 grade of asphalt sets quickly, so cover aggregate should go down immediately.

The seal coat should be 0.3 to 0.4 gal per sq yd of cut-back asphalt. It should be covered with fine aggregate while it still is warm. Rolling with both steel-faced and pneumatic-tired rollers should continue until a smooth, uniform surface results. As a final step, sweep all unbonded cover aggregate to the shoulder.

High-quality aggregates are essential to good penetration construction. But at times it may be necessary to use off-graded or softer aggregates. The voids in this type aggregate will be too small to permit penetration of RC-5 grade asphalt. In such cases, RC-4, RC-3, or RC-2 grades may be substituted according to conditions.

(Continued on page 160)



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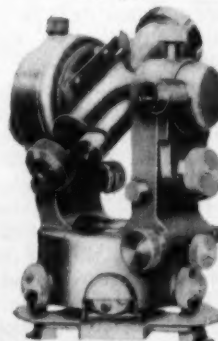
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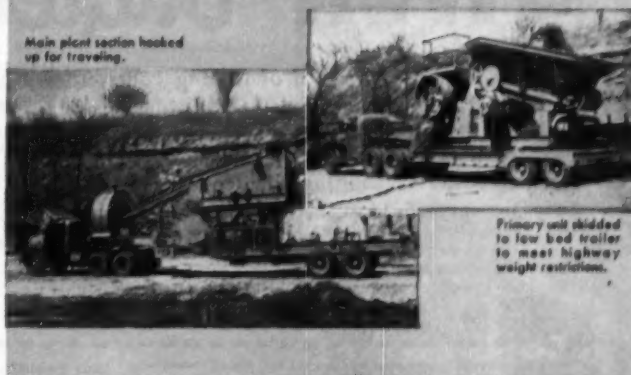
The TwinDual Pacemaker gives you three full stages of reduction for top capacity—a Universal overhead eccentric jaw crusher in the first stage and a TwinDual roll crusher for the second and third stages.

No other single unit plant offers so many big-profit advantages. Big primary jaw crusher accepts large rock—lets you work gravel pits containing big boulders. Exclusive TwinDual two-stage roll crusher gives top capacity secondary crushing. Its high ratio of reduction permits the primary jaw to operate at 50 to 100% wider discharge opening. This results in greater capacity—less jaw wear. Larger inclined gyrating screens with full screening area allow 20 to 25% greater output. All operations from apron feeder to delivery conveyor are driven through one single power unit.

For top capacity with three stages of reduction—and a bonus in longer crusher life, lower horsepower requirements and a better quality finished product, choose a Pacemaker. Available in five models for pit or quarry operation. Get complete profit making facts now.

LOW TRAVELING WEIGHT

The primary jaw crusher, apron feeder with grizzly by-pass, operator's platform and structural supports are all mounted as a single unit on skids. This primary unit is bolted to the main truck frame. When highway weight limitations must be met, this unit may be quickly skidded to a low bed trailer and transported separately.



PETTIBONE

UNIVERSAL

In Cedar Rapids Since 1906

UNIVERSAL ENGINEERING CORPORATION

327 - 8th St., Cedar Rapids, Iowa

Subsidiary of Pettibone Mulliken Corporation, 4700 W. Division Street, Chicago 51, Illinois



This impressive fleet of Byers Truck Cranes is lined up to start a Walsh-Perini-Groves-Slattery Co. construction job for the United States Steel Fairless Plant at Morrisville, Penna.

Four of these cranes are "Rigged for Results" for faster, more efficient excavating by being equipped with

OWEN Buckets

Owen wins the approval of leading contractors because of their superiority in handling all excavating, trenching, dredging and rock handling operations.

Owen material handling buckets are just as popular because they are specially designed to meet the wide variety of operations encountered in this field.



Send for free illustrated catalog today.

THE OWEN BUCKET CO.

Branches: New York, Philadelphia, Chicago, Berkeley, Calif., Fort Lauderdale, Fla.

PENETRATION MACADAM . . .

Continued from page 158

Summary

1. Before placing penetration macadam, it is essential to build a strong, well-consolidated base course.

2. Clean, strong aggregate is needed to obtain maximum durability. Grading is very important. The objective is to get aggregate substantially all one size. The compacted pavement layer should not be much thicker than the diameter of the largest particle of aggregate.

3. Thorough compaction and keying of the aggregate is essential. The thinner surfaces usually constructed by modified penetration methods do not require extremely heavy rollers, but it is necessary to exercise care in compaction so that a uniform condition of open voids results.

4. The distributor should be checked and re-checked to be sure application is at the required rate. Because of the voids in the compacted aggregate, larger percentages of asphalt are used for penetration work than for any other type of bituminous pavement. This gives the pavement great durability, but it also makes necessary quite exact application to avoid fat or porous areas in the surface.

5. Back-rolling for a week to 10 days helps produce high quality penetration surfaces. It is almost impossible to over-roll. Rolling should be at speeds of less than 3 mph.

6. As in all pavement construction, best results are obtained during warm, dry weather.

* * *

The fourth article in this series will appear in the December issue.

A Record Decade

Private and public construction in the U.S. during the decade since VJ Day totals \$392.5 billion, more than the total for the first 45 yr of the century.

A study by C.I.T. Corp. showed that \$23.7 billion was spent on highways and \$15 billion on schools. A total of 10,400,000 homes was built. The report predicted that construction during the next 10 yr would top the 1945-1955 record by at least one-third.

WHAM and it's fastened in steel or concrete with the new Creary "330" Drive-It[®] Tool

A fastening every 15 seconds with ease! The new Creary "330" DRIVE-IT Tool is the newest cartridge-powered fastening tool on the market. It will save you time and money . . . reduce your on-the-job costs.



NEW Creary "330" DRIVE-IT Tool fastening large steel switchbox to concrete wall in Anchorage, Alaska with Creary threaded *Drive-pins*.

Here are 8 reasons why you'll want a Creary Drive-It Tool

- 1. SNAP-OPEN ACTION** for fast loading and ejection. Greatest operating speed of any cartridge powered tool.
- 2. REQUIRES ONLY ONE STANDARD POWER LOAD** for all fastening jobs. No need to buy different strength cartridges for each job.
- 3. TWO CARTRIDGE-POWERED TOOLS** for light or heavy jobs. The new Creary "330" Drive-It Tool (.25 cal.); heavy-duty "410" Drive-It Tool (.38 cal.).
- 4. AUTOMATIC CARTRIDGE EXTRACTION** when breech is snapped open. Gives more fastenings per minute.
- 5. SAFETY IN FIRING**, as Drive-It must be pressed firmly against the work surface before tool can be fired.
- 6. STEEL ENCASED RUBBER GUARD** completely surrounds work area, another of the many safety and convenience features which make Creary Drive-It Tool the choice of contractors everywhere.
- 7. BARREL EXTENSION** allows fastening in recessed areas such as junction boxes, deep channel iron, and other confined spaces.
- 8. CREARY DRIVE-PINS** are U.L. approved, will penetrate up to an inch of structural steel and withstood a 10,000 lb. pullout test by Pittsburgh Testing Laboratories.

Start reducing your fastening costs today.

SEND FOR FREE CATALOG . . . ask for a free demonstration.

Powder Power Tool Corp., 7534 S. W. Macadam Ave. Portland, Ore.

Name _____

Address _____

City _____

Zone _____

State _____

Type of Business _____

☐ Want a Demonstration

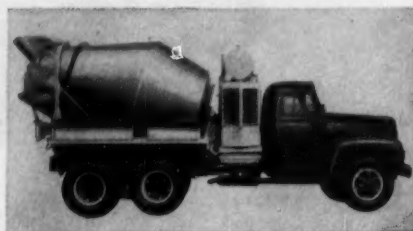
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(Advertisement)



CMC Transcretes make and deliver better concrete faster . . .

No wonder the "big swing" is to Transcretes. They're rugged, yet lighter in weight for more payload on the road, more concrete in the forms. New chute arrangement gives complete flexibility for any kind of pour. Transcrete's exclusive floating drive eliminates troubles experienced with ordinary rigid drives and has the simplest chain take-up ever.



3½ to 7 Yard Capacities

Write for New Bulletin
TM 1055

Actual picture of 1½" slump concrete coming out at **BETTER THAN A YARD EVERY 15 SECONDS!** Only with CMC's exclusive Swing-Out Hopper is this possible.

CONSTRUCTION MACHINERY COMPANY
Waterloo, Iowa



a "budget-priced"
concrete cutter
for patchwork
and repair jobs!

Let this low-cost 7½ h.p. concrete cutter help you on all maintenance and repair jobs! Light, powerful, easy to handle in tight spots. Blade mounts on either spindle end; lowers and raises hydraulically. Accessory coolant tank available for independent water source. Handles up to 12" blade diameters. Ideal for municipal use; meets budget requirements. Write for descriptive circular on the Model 100. Other DI-MET concrete cutters also available.



FELKER MANUFACTURING CO. TORRANCE • CALIFORNIA

World's Largest and Oldest Manufacturer of Diamond Abrasive Cut-Off Wheels and Machines

COLOR FILM AVAILABLE! For club and society programs request our 25 minute automatic strip film "DIAMOND MINING IN SO. AFRICA" with 33-1/3 rpm long play record!



Construction Men in the News...



AGC — FRANK J. ROONEY of Miami, Fla., was nominated to be the 1956 president of the Associated General Contractors of America. He's shown above (right) with AGC's 1955 president, GEORGE C. KOSS. LESTER C. ROGERS (far right) of Elgin, Ill., was nominated vice-president.

The nominees will be installed

during the AGC's convention in New York next February.

President of Frank J. Rooney, Inc., Miami building contractors, Rooney has been active in AGC affairs for many years serving on the association's advisory board, governing board, executive committee, and building contractors' committee.



Rogers, a civil engineer, is president of Bates & Rogers Construction Corp., a heavy and railroad construction firm, of Chicago. He has been a member of the governing board, executive committee, and labor committee. He also has represented the construction industry and the AGC in the International Labor Organization.



MOLES — HOWARD L. KING, (left) of New York, and HARVEY SLOCUM (right) of California are The Mole Award winners for 1956. The awards, given annually for outstanding achievement in construction, by The Moles, an association of leaders in the construction industry, will be made in New York next February.

King, holder of bachelor and master degrees from three famous universities, is a tunnel builder, while Slocum has risen from pile-driving "stiff" to an outstanding estimator and builder of dams.

King, 65, spent the first 5 yr of



his working life teaching school. He has been a tunnel man for 40 yr, the last 25 with Mason & Hanger Co. of which he is vice-president and chief engineer. He has played an important part in many of the best-known tunnels throughout the country.

Slocum, 68, referred to as "the best dam man in the world," will fly to New York from a dam job in India to receive his award.

Born in California, Slocum has run the gamut in construction jobs. He was a structural iron worker, pile-driver stiff, reinforcing steel man, concrete worker, and bridge

erector while rising to his first superintendent's job at the age of 26.

Since then he has figured in the construction of some of the world's largest dams and now is at work on Bhakra Dam, India. He is, perhaps, best known for his skill as an estimator in dam construction. During his career, he has supervised the pouring of 20 million cu yd of concrete.

NSC — ROBERT L. JENKINS, chief of the Safety Division, Corps of Engineers, Washington, D. C., has been elected general chairman of the Construction Section of the National Safety Council. He succeeds GEORGE P. O'ROURKE, SR., president, O'Rourke Construction Co., Dallas, Tex.

WILLIAM G. HAWKINS, insurance manager and safety director, Winston Bros. Co., Minneapolis, was named vice-chairman; JOHN L. JUNKERT, safety engineer, Marsh & McLennan, Inc., Minneapolis, was named secretary; and E. N. ZINER, safety engineer of the John A. Volpe Construction Co., Inc., Boston, was named assistant secretary.

Field Reports Prove Economy of New "Extra-Treated" Engine Oil

A completely new type of engine oil has been designed especially to prevent ring sticking in heavily loaded, high output diesel engines. It is the result of intensive laboratory and field investigation and has been fully approved as a "Superior Lubricant Series 2," by the Caterpillar Tractor Company under their new and more severe test procedures.

D-A "Extra-Treated" Diesel Oil contains approximately three times the detergency reserve of regular Series 2 lubricants.

But the proof of any new product is in its field performance. Since this new product has been in service we have received many outstanding field performance reports of which the following are typical.

Case History #1—Contractor on the Kentucky Turnpike had 3 motor scrapers using 10—9—7 gallons of oil respectively per 10-hour day. After changing to new type Series 2 D-A "Extra-Treated" Diesel Oil, consumption dropped to less than one gallon per day in each unit.

Case History #2—Contractor furnishing gravel for Bunker Hill (Indiana) Naval Air Base had a diesel power unit using 7 gallons of oil per 16-hour day operating a crusher. Within 200 hours after changing to new Series 2 D-A "Extra-Treated" Diesel Oil, consumption dropped to less than 1½ gallons per 16-hour day.

Case History #3—Contractor on St. Lawrence Seaway had two motor scrapers using 13 gallons of oil each per 20-hour day and one using 9 gallons per 20-hour day. After changing to new Series 2 D-A "Extra-Treated" Diesel Oil, consumption dropped to less than 3 gallons per unit for each 20-hour day.

Case History #4—Contractor on Navy Air Base, Lincoln, Nebraska, had several motor scrapers using 2 gallons of

oil each per 8-hour day. After changing to new Series 2 D-A "Extra-Treated" Diesel Oil, consumption dropped to less than 1 quart per 8-hour day in each machine.

Case History #5—West Virginia coal stripper was using 3½ gallons of oil per 20-hour day in a shovel engine. After changing to new Series 2 D-A "Extra-Treated" Diesel Oil, consumption dropped to less than 1½ gallons per 20-hour day.

Case History #6—Contractor on Indiana Turnpike had two motor scrapers using 5 to 8 quarts per 8-hour day. After changing to new Series 2 D-A "Extra-Treated" Diesel Oil, he now finds it necessary to add less than 1 gallon of oil between oil change periods (120 hours).

Case History #7—West Virginia coal stripper was using 3 gallons of oil per 18-hour day in a shovel engine. After changing to new Series 2 D-A "Extra-Treated" Diesel Oil, consumption dropped to less than 1 gallon per 18-hour day.

Case History #8—A stationary engine operating coal crushing and cleaning equipment in West Virginia was using 10 quarts of oil per 8-hour day. After changing to the new Series 2 D-A "Extra-Treated" Diesel Oil, consumption dropped to 6 quarts the first day—3 quarts the second day and has remained at 3 quarts per day.

If you are experiencing excessive oil consumption in severely loaded or supercharged diesel engines, contact your D-A representative or write the D-A Lubricant Company.

D-A "Extra-Treated" Diesel Oil is available in all D-A warehouses located in strategic points throughout the U.S. and from leading equipment dealers.



**D-A LUBRICANT
COMPANY, INC.**
Indianapolis 23, Indiana

SPECIALISTS IN HEAVY-DUTY LUBRICATION SINCE 1923

CONSTRUCTION MEN . . . Continued



BURTON F. MILLER, 48, has been named deputy executive vice-president of the American Road Builders Association. An attorney, Miller has been on the ARBA staff for 20 yr. He manages the association's Contractor's Division and its Division of Materials and Supplies.



EUGENE F. GIBBONS of Valley Stream, N. Y., has been appointed chief engineer of the N. Y. State Department of Public Works. A graduate of Manhattan College School of Engineering, he received his master's degree from Polytechnic Institute in Brooklyn, N. Y. At the time of his appointment, Gibbons was associated with the New York contracting firm of J. Rich Steers, Inc.

WILLIAM A. LOUMOS has been named district engineer for the Austin Company and put in charge of the eastern district with headquarters in Roselle, N. J. He has been with Austin since 1939, serving as engineer and architect.

"Aeroquip has been a Major Cost Cutting Idea"

Says W. W. Hise, Shop Superintendent, J. W. Moorman and Son



J. W. Moorman and Son maintains an inventory of Aeroquip bulk hose and fittings at the Buford Dam Project.

50 pieces of heavy equipment work multiple shifts on the Buford Dam Project now under construction at Buford, Georgia, by J. W. Moorman and Son. 10 maintenance men and 2 service trucks are required to keep the equipment on the go. And a compact inventory of Aeroquip's bulk hose and fittings meets all fluid line replacement needs.

Shop Superintendent W. W. Hise reports, "Nearly every day we make an original equipment hose replacement using Aeroquip. The bulk hose idea cuts downtime."

Any Aeroquip distributor listed in your Yellow Page Directory can show you how to cut costs with Aeroquip . . . or write us direct.



Downtime due to hose line failure is held to a minimum. Here a parts man selects fittings prior to assembly.



Hose is cut to length and fittings are attached in a few minutes. With Aeroquip, only ordinary shop tools are needed.

Aeroquip

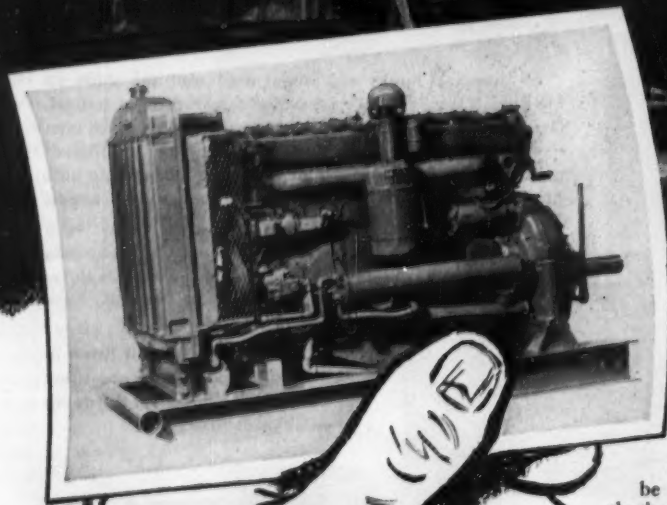
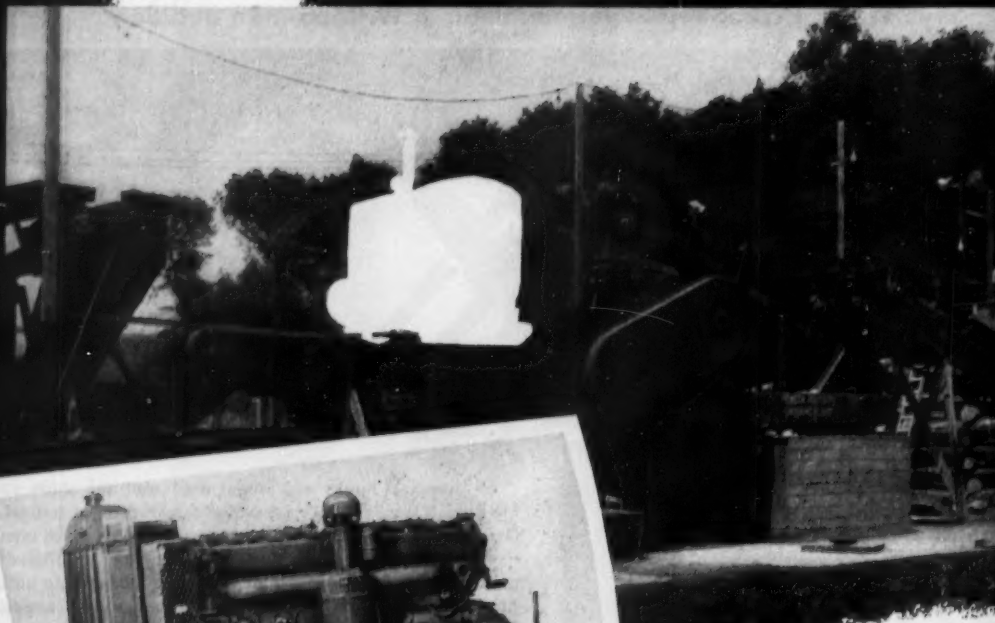
AEROQUIP CORPORATION, JACKSON, MICHIGAN

LOCAL REPRESENTATIVES IN PRINCIPAL CITIES IN U.S.A. AND ABROAD • AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U.S.A. AND ABROAD

THE



PICTURE ISN'T RIGHT...



**until you put
MURPHY DIESEL
into it !**

The best crushing plant in the world can't be any more efficient than its power plant. And that's why more and more aggregate producers are turning to Murphy Diesel Power. Heavy duty Murphy Diesels offer an exclusive combination of design features that make it possible for you to get more aggregate per dollar of power costs. With Murphy Diesel in the picture you get greater fuel economy, longer life and dependability unmatched by any other engine of comparable size. It all adds up to a prettier profit picture for you.

Murphy Diesel offers three types of power to best suit your needs—standard power units, electric generating sets and Mech-Elec Units which will supply both mechanical and electrical power separately or simultaneously. Ask your Murphy Diesel Dealer to give you complete information on the unit that will serve you best.

MURPHY DIESEL COMPANY

5339 W. Burnham St.

Milwaukee 14, Wisconsin

Sales, parts and service throughout the nation

**MURPHY
DIESEL**

Heavy duty power for construction

Murphy Diesel Engines and Power Units are available in sizes from 96 to 264 H.P. Engine speeds are 1200 and 1400 rpm. "Packaged" generating units are available with capacities ranging from 60 to 165 K.W.

SALES AND ★ SERVICE ★

News of manufacturers' activities designed to assist the reader in the purchase of machinery, equipment and materials and help him obtain quick service on parts and maintenance.

Distributor Appointments

Rubarite, Inc.: Borne, Scrymser Co. of Elizabeth, N. J. and Charlotte, N. C. have been appointed representatives for Rubarite, a free-flowing, unvulcanized synthetic rubber product for rubberized asphalt paving. When added to asphalt and tar, it improves the flexibility, impact resistance, temperature stability and aging characteristics of these bitumens. Their territory includes Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Delaware and North and South Carolina.

Warner & Swasey Co.: Three new distributors for the multi-purpose Gradall have been announced. The Western Traction Co., San Francisco, will sell the Gradall in Northern California. The Funkhouser Machinery Co., Kansas City, has been assigned a territory that includes Jewel, Mitchell, Lincoln, Ellsworth, Chase, Woodson, Wilson and Montgomery counties in Kansas and 13 Missouri counties. The Road Machinery and Supplies Co., Duluth, Minn., will handle the entire state of Minnesota.

Prime Mover Co.: Anderson Equipment Co., Pittsburgh, Pa., has been named distributor for Western Pennsylvania. At the same time Prime Mover named Tri-State Equipment Co., Memphis, Tenn., to handle its line of powered carts in Western Tennessee, Northern Mississippi and Eastern Arkansas.

On the Sales Front

Harnischfeger Corp.: Several district managers have been appointed in the newly organized construction and mining division. They are Philip C. Petry for Boston, Raymond M. Calkins for Birmingham, Alfred E. Hoehler for Pittsburgh, Andrew B. Conner for Detroit, Gordon E. Leopold for Minneapolis, Herman E. Sutter for Kansas City, and Jack G. Walker for Dallas. Richard B. Maxson has been appointed a sales engineer in the Buffalo office.

McKiernan-Terry Corp.: R. H. Nelson has been named assistant sales and service manager of the company's pile-hammer division. Nelson formerly was a sales engineer for Garlinghouse Bros., construction equipment distributor of Los Angeles.

KOHLER ENGINES

4-CYCLE • AIR-COOLED



K160
6.6 H.P.
Full Power

**A Quality Engine for
Quality Equipment**

Short Stroke

- Less Friction and Wear
- More Power
- Longer Life

Easy Starting

K90.....	2.5 to 3.6 H.P.
K160.....	3.6 to 6.6 H.P.
K330.....	7 to 11.8 H.P.
K660.....	12 to 26 H.P.

Kohler Co., Kohler, Wisconsin
Established 1873

KOHLER OF KOHLER

PLUMBING FIXTURES • HEATING EQUIPMENT • ELECTRIC PLANTS
AIR-COOLED ENGINES • PRECISION CONTROLS

MORE HEAT 300,000 BTU's PER HOUR LESS COST



FOR
**HEATING
DRYING
THAWING**

Clayton SUMMERRAIRE

Contractors, don't let cold weather delay construction, slow down production, increase costs. The Clayton Summerraire portable, oil-fired space heater dries out new construction; prevents freezing of concrete while curing; thaws out ground, materials and equipment; keeps workmen warm. Summerraire . . . priced 20-30% lower than other heaters of less capacity . . . delivers 2400 cu. ft. high velocity heated air per minute at low cost; 300,000 BTU's per hr. Available with electric or gasoline engine drive. Send coupon for details.

MAIL THIS
COUPON FOR
FULL DETAILS

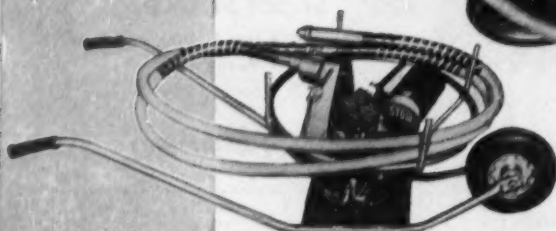
CLAYTON MANUFACTURING CO.
BOX 550, EL MONTE, CALIF.
Send me complete information, regarding
Summerraire heaters, including specifications,
prices, operating costs and name of nearest distributor.

NAME _____
FIRM _____
ADDRESS _____
CITY _____ STATE _____

CME-11

New performance features built into **STOW** **CONCRETE VIBRATORS**

MODEL AG



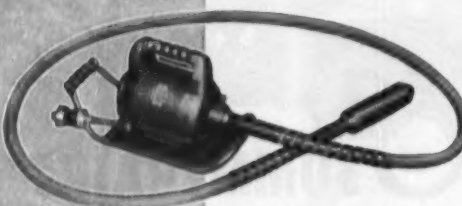
SHOWN: MODEL BGW. This is the standard STOW model BG vibrator, mounted on wheelbarrow for easy maneuverability. Model BG & BGW feature 2 HP 4 cycle, air-cooled engine; ball-bearing eccentric belt tensioner.

Contractors like STOW vibrators because the high operating speeds of this new STOW vibrator line make possible the use of heavy duty, light weight flexible shafting, and lighter, more efficient vibrator heads. And STOW design provides convenient speed control so that attachments for rubbing, grinding, cleaning may be used directly on the vibrator shafts, making it unnecessary to purchase extra shafts for this purpose.

The STOW line is complete . . . provides the right vibrator for every job. Complete accessories available. Be sure you see your STOW distributor about the STOW line!



MODEL J—The lowest priced vibrator in the STOW line. Slower speed means longer, trouble-free operation. Model J features 3600 (max.) VPM, 2 HP 4 cycle air-cooled engine, and direct drive.



MODEL BU—Features 2 HP at 9000 VPM, operates on 115 volts AC or DC with splash-proof, high speed ball-bearing motor.

See how STOW can save money
for you! Send for Free
Catalog 552



STOW

MANUFACTURING CO.

31 Shear Street, Binghamton, N. Y.

SALES AND SERVICE . . .

Continued

Sheppard Diesels, Inc.: Russell L. Willetts has been appointed sales manager, engine division. He had been manager of the original equipment division for the last 1½ yr.

Joy Manufacturing Co.: J. E. Douglas has been named district sales manager of the El Paso territory to succeed E. E. Miler, who has retired after 43 years with Joy. Douglas was formerly assistant district sales manager.

American Tractor Corp.: Because of rapidly increasing sales of its TerraTrac crawler tractors and equipment abroad, Robert Fomberg has been named to the new export sales manager position, according to D. A. Milligan, vice-president in charge of sales. He will begin immediately to set up a world-wide TerraTrac distributor organization.

Special Mention

Johns-Manville Corp.: The industrial products division has been split into three new operating departments to be called the pipe division, packings and friction materials division, and industrial insulations division. The expansion in organization, which becomes effective Jan. 1, continues the decentralization of operations started in 1946 and backed by a continuing plant expansion program costing about \$20 million.

Borg-Warner Corp.: Byron Jackson, pioneer west coast manufacturer of pumps, oil tools and electronic equipment, has become the Byron Jackson Div. of Borg-Warner. Present management and policies will be continued, according to the announcement.

Macwhythe Co.: The wire-rope manufacturers have moved into new quarters at 188 King St., San Francisco. The new building is equipped with facilities for handling, cutting, and shipping wire rope. Other West Coast warehouses and offices are located at Los Angeles, Portland and Seattle.

U. S. Plywood Corp.: The sales headquarters of the flexible materials division has been transferred from New York to Louisville, Ky., to coordinate more closely the manufacturing and sales of Flexwood paneling and Kalistron sheet plastic sheeting materials.

New Britain Machine Co.: The Blackhawk Mfg. Co.'s line of hand tools has been purchased by New Britain, who will merchandise tools in all markets, including automotive and industrial. Blackhawk will continue to specialize in hydraulic products and lifting equipment.

NEW *Mack* B-80 SERIES—

a money-making giant for heavy construction



New features make this rugged six-wheeler more powerful, sturdier . . . and a greater work producer than even its great Mack predecessors!

GREATER DIESEL POWER. Mack's famous Thermodyne® Diesel is now turbo-charged to 205 h.p.; other turbo-charged diesel power up to 262 h.p. is available.

MORE BRAKING POWER. Mack Thermodyne Diesel engines are recognized as having more braking power than any other. Now new exhaust brakes increase their retardation by 50%, while adding greatly to brake lining life.

NEW TRANSMISSIONS. From 10 to 20 speeds, with a wide range of options of final drive ratios to meet any operating conditions. Complete one-box units—no auxiliary transmissions or two-speed axles are necessary.

SQUARE-CUT MILITARY FENDERS. Make the Mack B-80 series look even more like the sturdy work-champions they are! Functional too—they provide strong, steady working platforms.

IMPROVED MACK BALANCED BOGIE. Assures positive traction no matter what the load or terrain. Mack's exclusive Power Divider delivers torque to each wheel in proportion to its traction, eliminating useless wheel slippage and spinning.

UNITIZED CABS. Roomier, stronger, thoroughly ventilated Mack "B" cabs are more comfortable and fully accessible. "Unitized" construction—radiator, fenders and cab mounted as integral unit at 4 points—means longer cab life, greater stability.

FULL RANGE. 11 models to choose from, giving you a complete selection of sizes and capacities to meet your own needs exactly.

You get more power—greater reserve power—to pull through with any load, on the tightest schedules when you put new Mack B-80's on your jobs. And you get all the features that you need for top efficiency and performance in the field, too! For the full story, see your Mack branch or distributor.

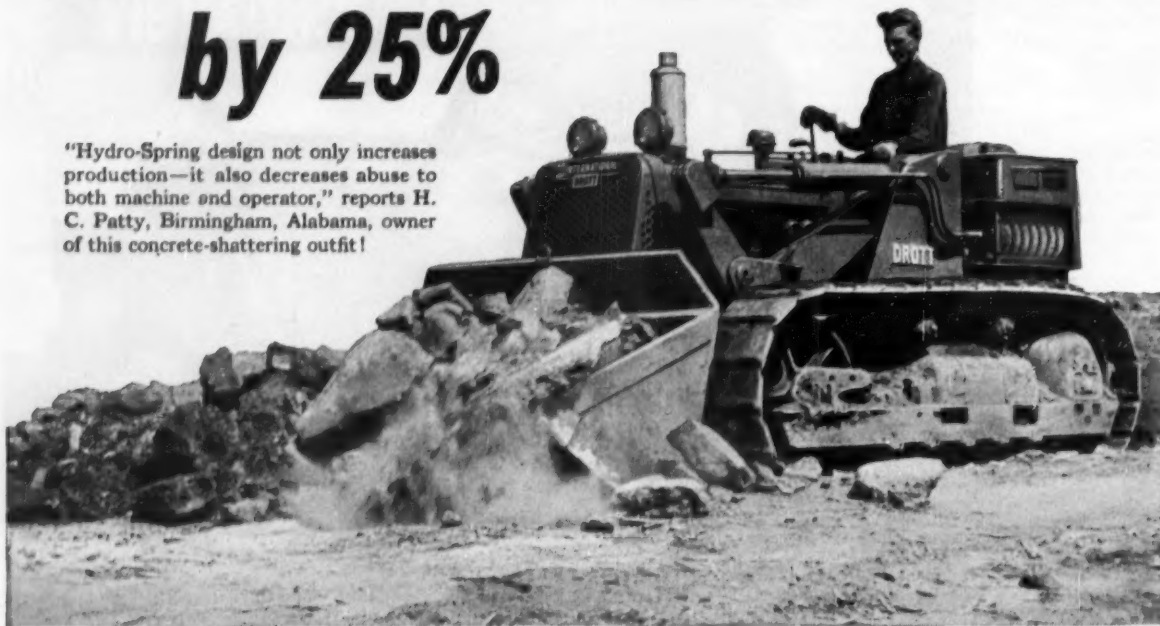
3471

MACK TRUCKS

Empire State Building, New York 1, N. Y.

How Hydro-Spring's "Shock Cushion" Helps Skid-Shovels outlast all others *by 25%*

"Hydro-Spring design not only increases production—it also decreases abuse to both machine and operator," reports H. C. Patty, Birmingham, Alabama, owner of this concrete-shattering outfit!



Slam this super-stout bucket into compacted material, and you generate impact stresses that make unprotected front-end loaders shudder!

But International Drott Skid-Shovels smother these shocks enroute, before they can sprain a sacroiliac, strain a track frame, or maim a final drive! Machine-mauling shock stresses "lean" against exclusive Hydro-Spring's "magic cushion"—and they're absorbed!

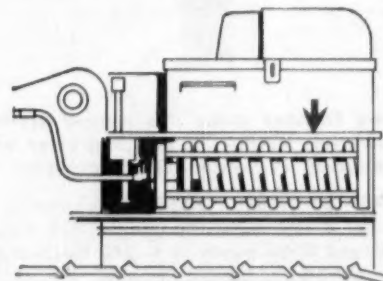
No Strain! No Pain!

You apply the patented pry-action break-out—and you get up to three times as much material-loosening, bucket-cramming force as the ordinary front-end loader can muster. Even then, shock-swallowing Hydro-Spring wards off strain and pain! Owners declare that Hydro-Spring adds a whopping 25 per cent to loader and tractor life—reduces downtime and boosts production, too!

No other front-end loader has Hydro-Spring advantages—which you get in four big-capacity, contractor-proved International Drott Skid-Shovel sizes. Why not ask your International Drott distributor for a demonstration of the money-making size best suited to your needs?



INTERNATIONAL
DROTT

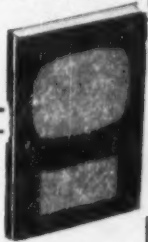


How exclusive Hydro-Spring works and saves for you!

Exclusive Hydro-Spring is a hydraulic cylinder enclosed in a heavy-duty coil spring. Shock force displaces oil from main lift cylinders into the Hydro-Spring cylinder—extending it and compressing the big spring to *absorb* and *cushion* impact loads. Hydro-Spring reduces the consequences of shock forces by an *actual 67 per cent or more*—also eliminates most hydraulic hose failures!

CONSTRUCTION ESTIMATES and COSTS

A practical book that shows you how to estimate construction costs quickly and accurately. Gives step-by-step instructions for estimating construction work of all kinds, including excavations, all parts of buildings, concrete, structural steel, and material transportation, profit, overhead, etc. Includes many illustrative worked-out estimates of typical jobs.
By Harry E. Pulver, Prof. of Civil and Structural Engineering, Univ. of Wisconsin. Second Edition. 653 pp., 287 illus., \$8.00



SOIL MECHANICS, FOUNDATIONS AND EARTH STRUCTURES

Covers the theory of soil mechanics and the principles and practices of designing and constructing foundations and earth structures. Emphasizes experimental data and field observation, giving numerous examples of structures. Covers estimation of shearing strength of soils, lateral earth pressures, effects of plastic flow, sensitivity of various clays to remolding, etc. By Gregory P. Tschoboroff, Prof. of Civil Engineering, Princeton Univ. 655 pp., over 400 illus., 7.50



DESIGN of CONCRETE STRUCTURES

A compact, handy manual of the most important phases of designing simple structures. Covers theory, methods, and practical examples of reinforced concrete structures. Fifth Ed. of Urquhart and O'Rourke, prepared by L. C. Urquhart, Consulting Engineer, and G. Winter, Prof. of Structural Engineering, Cornell Univ. 508 pp., 135 illus., \$7.50

CIVIL ENGINEERING HANDBOOK

3rd Edition brings you fundamentals, theory, and modern practice in various subdivisions of civil engineering. Covers surveying — railway, highway, and airport engineering — mechanics of materials — hydraulics — stresses in framed structures — steel design — cement and concrete — foundations — sewage disposal — water supply and purification. Editor-in-Chief, L. C. Urquhart, Consulting Engr., New York, N. Y., and Newark, N. J. 3rd Ed. 976 pp., 900 illus., \$11.00



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SALES AND SERVICE . . .

Continued from page 148

Industrilline, Inc.: A new corporation has been formed for the manufacture and distribution of equipment for the welding and electrical transmission industries. General offices of the new firm are at 441 Lexington Ave., N. Y. 17, N. Y. The factory is located in Cincinnati, Ohio. J. B. Nottingham is president.

In the Main Office

Johns-Manville Corp.: C. George Dandrow has been appointed to the newly created post of vice-president for customer relations. In his new post, Dandrow will aid company divisions in sales of all products to the building, utility and industrial fields, and also handle company trade-relations activities.

Permutit Co.: Richard A. Ogden, treasurer and assistant to the president, has been elected secretary in addition to his other duties. A. F. Bogle, controller, and A. E. Marcic, assistant treasurer, were elected assistant secretaries at the same time.

Gar Wood Industries, Inc.: Angus J. O'Brien, vice-president and director of manufacturing, has been named to the newly created position of vice-president and director of engineering and manufacturing. In his new position O'Brien is responsible for integrating and coordinating the engineering and manufacturing activities of the firm.

Owens-Corning Fiberglas Corp.: Reeve K. Biggers has been appointed national account executive, it was announced recently. The position was created, according to Harold Boeschstein, president, to render better service to major customers headquartered in the metropolitan New York area, but operating throughout the United States.

American Diamond Tool Co.: Frederick A. Henry, formerly general manager of the Pacific Coast works of the A. O. Smith Corp., has been named president and general manager. Henry is a retired colonel in the air force.

Associations

Wire Reinforcement Institute, Inc.: Henry Aaron, former C.A.A. chief of airports, technical branch, has been named highway and airport engineer by the institute. In his new position, Aaron will work with highway and airport engineers throughout the country to develop standards and specifications for the reinforcement of portland cement concrete pavement with steel welded wire fabric.

End Company Xmas Gift Problems the "Select-A-Gift" Way

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. . . You Pick The Price Range—
Five Groups . . . \$6.62 to \$47.25

Stop worrying if they have one . . . if they want one . . . what size or color. Pick your price range and we mail or you give a beautiful combination Christmas Card-Gift Folder to each person on your list. Folder is personalized with your name and/or your company's, and illustrates as many as 24 of America's most-wanted nationally-advertised gifts. Recipient tells us the gift he wants from you; we ship it to his home.

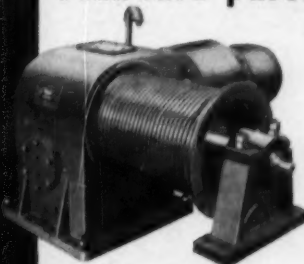
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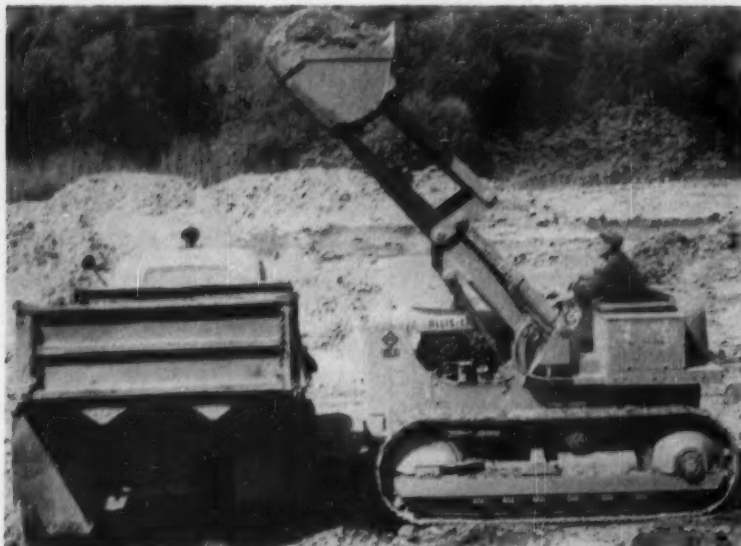
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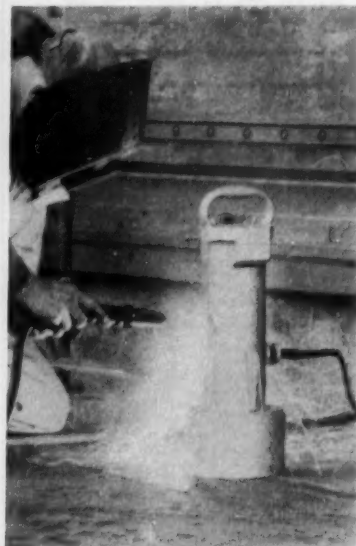
CONSTRUCTION EQUIPMENT NEWS



New A-C Tractor Shovel and Crawler

The 19,600-lb HD-6G tractor shovel and 12,400-lb HD-6 crawler are powered by an HD-344 diesel engine developing 45 dph, 55 hp at the belt. HD-6's maximum drawbar pull is 12,650 lb. The HD-6G, with a 1 1/3-yd bucket, keeps 83 in. of track on the ground for

good stability without counterweight. Like other HD models, both have "wrap around" radiator guards, box-type "A" main frames, and roller bearing track wheels that need lubrication only after 1,000 hr.—Allis-Chalmers Manufacturing Co., Milwaukee, Wis.



Magnetic Clamp

The Bux magnetic plant clamp eliminates jigs, dogs, and other clamps used to position metal plates for welding. The 50-lb tool generates 1 1/2 tons of pull to bring plates flush and secure them for butt welding.—Buck Manufacturing Co., Los Gatos, Calif.



Heavy-Weight Utility Tractor

New model 300 utility tractor weighs 3,820 lb, high for its class. Available with standard transmission or I-H's Torque Amplifier, the 42-hp tractor has a 75-in. wheelbase, turns in 9 ft, 8 in. Hydra-touch controls operate front- and rear-mounted attachments simultaneously or individually.—International Harvester Co., Chicago 1, Ill.



Attachment Mixes Aggregates

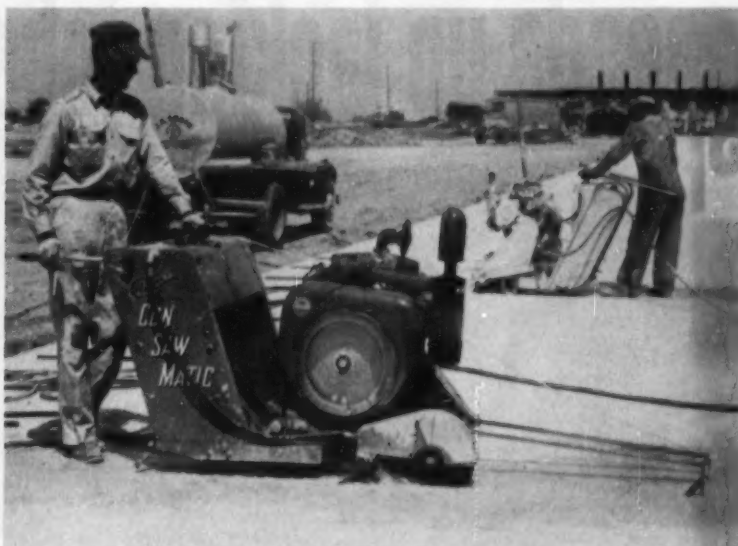
A conveyor attachment thoroughly mixes water and calcium chloride with aggregate. The mixing unit, consisting of an 18-paddle pugmill and 2-in. spray bar, eliminates on-the-job sprinkling, provides dust-free gravel or crushed rock that compacts to a hard, stable surface.—Iowa Manufacturing Co., Cedar Rapids, Iowa.

On-the-Job Previews of Machinery, Tools and Equipment



Lath Conveyor

Working through small openings and at any angle up to 70 deg, a 16-ft lath conveyor delivers 18 bundles a min to hard-to-reach places. It is powered by a K90R Kohler engine rated at 3.6 hp.—**E. C. Robinson, 2442 Hidalgo Ave., Los Angeles, Calif.**



Self-Propelled Concrete Saw

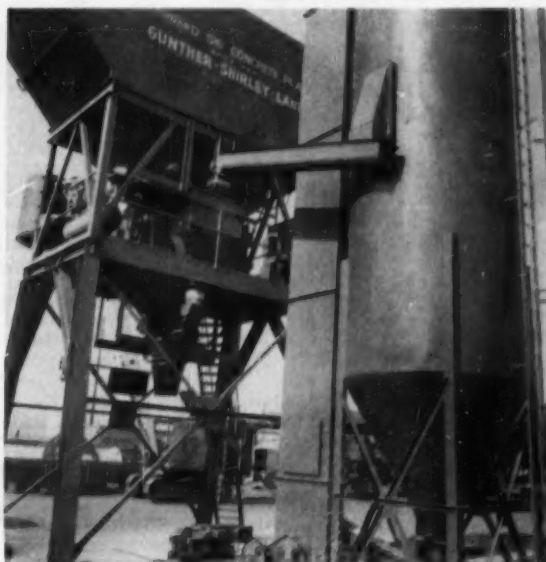
Although it weighs more than 1,000 lb, one man easily handles the C-360 concrete saw because it has dual caster wheels that automatically lower to take over the load from the rear wheels when the blade is raised from the cut. This feature lessens line-up time,

eliminates lifting and tilting forward or backward when positioning the saw. A 36-hp Wisconsin engine moves the saw at up to 26 fpm. In background is the smaller 25-hp C-250 saw.—**Clipper Manufacturing Co., 2800 Warwick, Kansas City 8, Mo.**



Vibrator With Lightweight Head

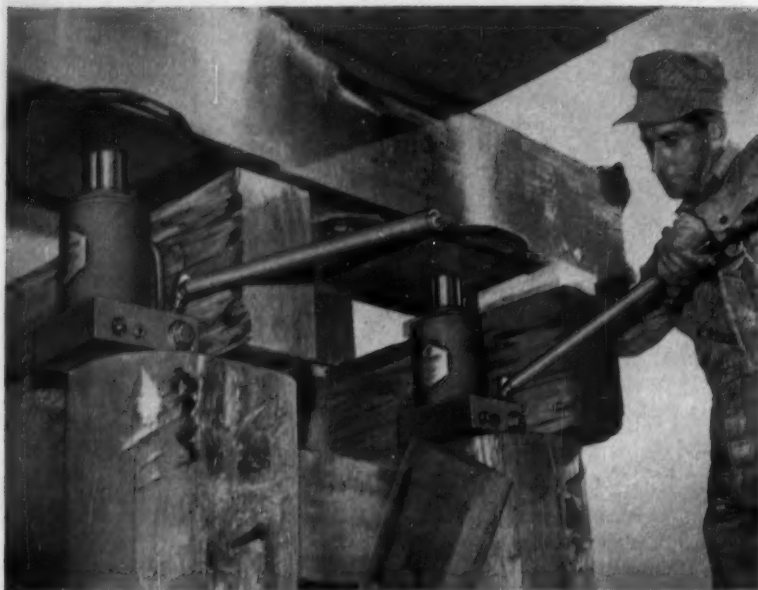
Powered by a 2-hp gasoline engine, the rubber-tired BGW concrete vibrator produces 6,000 to 9,300 vibrations per min. The 1 3/8-in. head, weighing only 5 lb, 7 oz, has a replaceable hardened-steel tip. Flexible shafts come in various sizes, can be joined to form 35-ft. line.—**Stow Manufacturing Co., 31 Shear St, Binghamton, N. Y.**



Moves Over Highways

The 150-ton 4A-150P concrete batching plant can be knocked down into four parts, transported over the highway, and reassembled in two days. Unit has a 550-bbl vertical batching and storage silo. Controls, including Hardy three-batch selector system, are operated by one man.—**Standard Steel Corp., 5025 Boyle Ave., Los Angeles, Calif.**

Here's how Blackhawk design speeds up jacking jobs



ONE MAN on a short handle quickly applies vast lifting tonnage. Above — two 50-ton Blackhawk Hydraulic Jacks supply precision raising and lowering to 1/1000 of an inch — promoting efficiency, safety and speed.



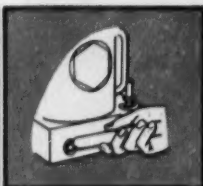
"Lightning Lift" — Exclusive double pump construction for quick load contact and easy power lifting.



More Efficient! One-man operated Blackhawk Hydraulic Jacks are 94% efficient as compared with only 12 to 30% efficiency for mechanical jacks.



Easily Carried by One Man! Compact, lightweight Blackhawk jacks are easy to position in tight spots.



Exclusive design features prevent damage!—eliminate costly delays on the job. Avoid many expensive repairs to jacks.

More ease, too! This combination of big exclusive features is a sure key to less effort plus greater speed and better workmanship on jacking jobs. They are some of the reasons why Blackhawk Hydraulic Jacks are so superior.

You also have extra utility — by attaching a gauge (do it yourself easily) to test, weigh, etc. And Blackhawk Jacks last longer and are so trouble-free because they are fortified with exclusive design features proven by 27 years of field experience. Get Blackhawk Jacks (at new low prices) from leading supply houses.

Bank on Blackhawk for the
**MOST COMPLETE LINE
OF HYDRAULIC JACKS**
... 1½ to 100 Tons



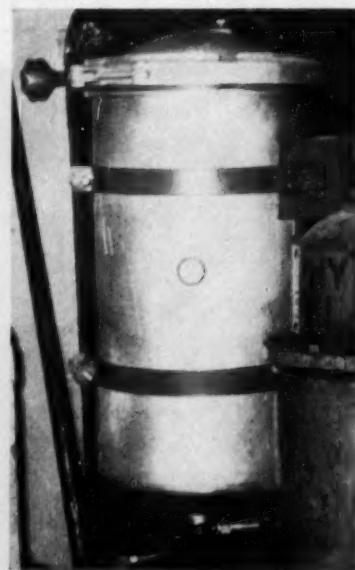
BLACKHAWK®

HYDRAULIC TOOLS • HAND TOOLS

BLACKHAWK MFG. CO., J-23115,

Milwaukee 46, Wis.

EQUIPMENT NEWS . . . Continued



QUICK-CHANGE OIL FILTER—A one-piece, aircraft-type ring clamp that securely holds the cover on the tank without nuts or bolts enables the model WD-2 filter to be changed in 3 min. without tools. Called the Clar-O-fier, the 750-cu in. filter uses a full size 8x15-in. cartridge. An "O" type ring gasket prevents oil leakage at any pressure.—W. G. B. Oil Clarifier, Inc., Kingston, N. Y.



BUILT-IN COOLING SYSTEMS—The model A-1 Hanmole, a lightweight, 3,200-rpm diamond-bit hand drill, is equipped with a water injection system that forces water down the center of the drill bit to act as a cooling agent. Unlike a water swivel attachment to an electric drill, the Hanmole is a compact unit designed especially for cutting holes in glazed tile, brick, concrete, granite, marble, and other hard surfaces. A lightweight pressure tank with a 30-min supply of water is available for outside jobs. Simple adapters allow bit size variations of from ¼ to 2 in.—Molco Drilling Machines, Inc., 1100-20th St., N. W. Washington 6, D. C.

Resists Shock !



Are the bearing units in your equipment subjected to heavy shock loads? Then, switch now to Sinclair **HEAVY DUTY BEARING GREASE** for better lubrication, longer bearing life. This *extreme pressure* grease is specially compounded for severe service lubrication in construction, mining and quarrying equipment.

Tests prove Sinclair **HEAVY DUTY BEARING GREASE** *resists shock loads, water, heat, throw-off, and squeeze out.* Try it—for longer, bearing life... higher productivity... lower operating costs.

A Sinclair Lubrication Engineer can give you expert counsel on how to get the most out of your equipment with Sinclair **HEAVY DUTY BEARING GREASE**. Phone your local Sinclair Representative or write Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y. *There's no obligation.*

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HEAVY DUTY BEARING GREASE

DEMPSTER DIGGSTER® GRD-101

....only front end loader or small shovel of its type with bottom dumping bucket!



HERE IS A SMALL SHOVEL and front end loader that is fully operated by hydraulic power with independent crowd and hoist action—an excavator and loader that needs no wheel traction. It is the only shovel of its type featuring bottom dumping bucket—emptied completely and instantly!

Hydraulic crowd and hoist moves bucket out-and-up to follow contour of material—getting a full load with every stroke. This reduces both loading time and idle truck time to a minimum. Thus, gets the job done faster!

The Dempster-Diggster is the only small shovel that offers you all the important features of big shovels . . . Simultaneous and Independent Crowd and Hoist . . . Hydraulic Crowding . . . Hydraulic Hoisting . . . Variable Crowd Action at any Dipper Position in addition to Changeable Bottom Dumping Buckets for digging or loading. Write for complete facts on this revolutionary, power-packed hydraulic shovel. A product of Dempster Brothers, Inc.

Above Dempster-Diggster GRD-101 is equipped with 1½ cu. yd. loading bucket for materials-handling. Photo below shows Dempster-Diggster GRD-101 excavating with 1 cu. yd. bucket with four teeth.



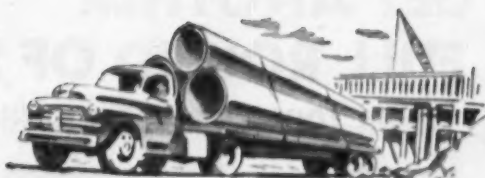
DEMPSTER BROTHERS 3115 SHEA BLDG., KNOXVILLE 17, TENN.

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Reduce
Maintenance
Costs



More Than Two Million
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By providing a gear ratio best suited for each road and load condition, Eaton 2-Speed Axles permit engines to work in their most efficient and economical speed range, reducing stress and wear on operating truck parts. Truck maintenance is reduced, trucks deliver more on-the-job hours. In addition, because of Eaton's exclusive planetary design, forced feed lubrication, and extra rugged construction, there's less maintenance on the axle itself. When axle repair is required, Eaton's down-to-earth design makes the work quick, easy, and economical. Trucks with Eaton 2-Speed Axles last longer, earn more at lower cost, are worth more on the trade-in.

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PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings • Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

GET ANOTHER FULL ROUND OF SERVICE FROM YOUR WORN OFF-THE-HIGHWAY TIRES



#20 Construction Tread illustrated. Other designs available to fit variety of conditions and equipment.

TREADING truck and earthmover tires with the special Hawkinson Construction Tread is proving to be a considerable economy measure on many construction projects.

For approximately half the cost of a new tire, contractors repeatedly have obtained another full round of service out of a tire, and frequently a second and third if the casing hasn't been damaged beyond repair.

Before you buy new tires for any of your rubber mounted equipment, it will pay you to discuss your tire needs with one of the highly trained and thoroughly experienced Hawkinson Tread Operators located across the nation.

WRITE us for complete information on our widely accepted line of Hawkinson processed treads and the name and address of the nearest fully equipped Hawkinson operator.

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1325 WINTER ST. N.E.

MINNEAPOLIS 13

MINNESOTA

EQUIPMENT NEWS . . .

Continued from page 174



ELECTRICAL SYSTEM TESTER—

The inexpensive Volt-Amp tester checks voltage and current regulators, as well as the primary electrical system of vehicles using 6- or 12-v systems. The manufacturer claims meter accuracy to be closer than 2% of full scale reading. All tests are said to be made in accordance with original equipment manufacturers' recommended procedures.—**King Electric Equipment Co., Cleveland 5, Ohio.**



VERSATILE FASTENER—Better than 90% of the usual construction fastening jobs can be handled with a single tool, according to the manufacturers of the new Duo-Jobmaster powder-actuated fastener. The main feature is that it can be used on either a $\frac{3}{8}$ - or $\frac{1}{4}$ -in. stud with only a simple change of the barrel. A worker can carry the spare barrel in his pocket and make the change in minutes without having to remove the entire lower assembly. Like its predecessor, the Jobmaster, the new tool features low recoil, a safety feature that prevents the tool from firing unless the base plate is flush with the surface to be penetrated, and a redesigned housing.—**Ramset Fastening System, Winchester-Western Div. of Olin Mathieson Chemical Corp., 460 Park Ave., New York 22, N. Y.**

SAFETY APPROVED

SALES • RENTALS • SERVICE IN PRINCIPAL CITIES ALBINA MECHANICAL STIRRUPS

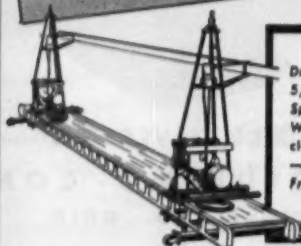
and CLIMBERS

STIRRUPS

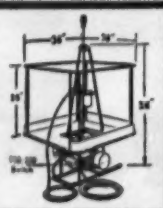
Electric or air operated. Swing Stage or Basket. Straight or curved platforms. 395' lift.

CLIMBERS

Electric or air operated. Swing Stage or Basket. 150' lift.



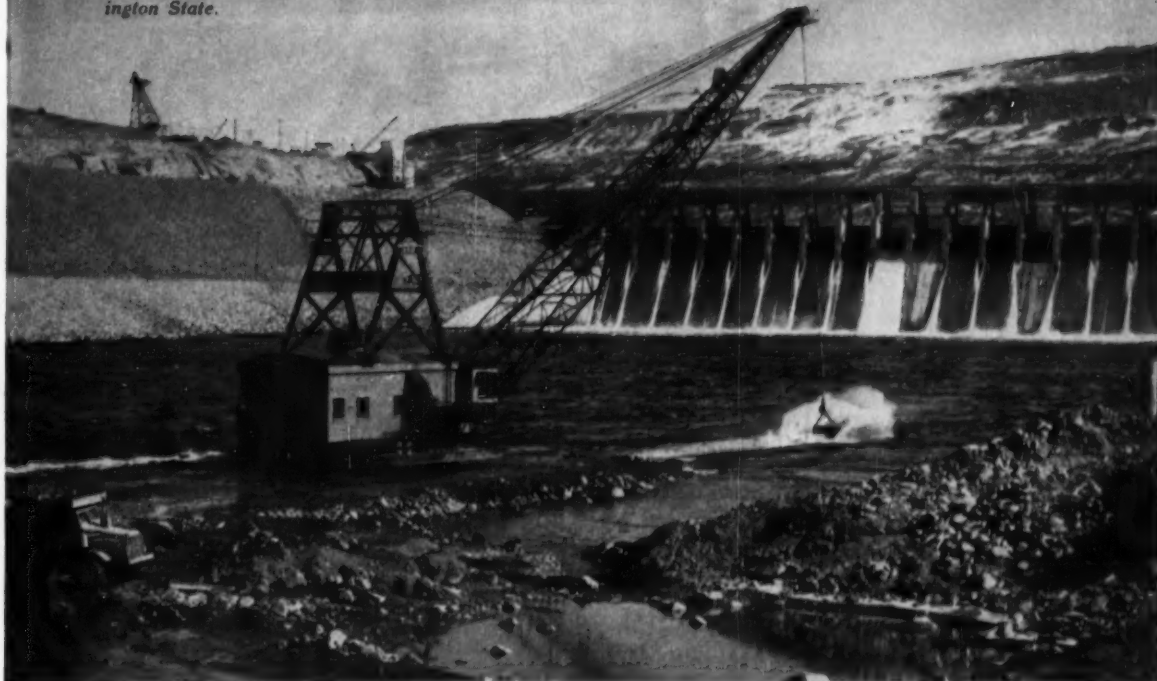
Drum Capacity: 150' 5/16" wire rope.
Speed: 20' per min.
Weight: Climber, including single basket — 225 lbs.
Frame: Steel tubing.



ALBINA ENGINE & MACHINE WORKS, INC.
2100 N. Albina Avenue • MU 1131
Portland 12, Oregon

Manufacturers of
Albina Mechanical Stirrups
Curved Platforms, Outriggers

This Bucyrus-Erie walking dragline is handling excavation of blasted rock and river bottom overburden below the tailrace area of Chief Joseph Dam in Washington State.



**Want to move really BIG yardages . . .
economically?**

PUT A BUCYRUS-ERIE WALKING DRAGLINE ON YOUR JOB

When you're faced with a job that calls for really big yardages, you'll be ahead by putting a Bucyrus-Erie walking dragline to work. It will give you the big capacity you need to get the job done fast, the performance that holds costs in line, the dependability that makes the most of every hour of working time.

You'll find the machine you need in the Bucyrus-Erie line—the world's largest selection of walking draglines. Each model offers features that have made these machines outstanding performers for years—such as simple

main machinery for year-after-year dependability; exclusive walking mechanism for smooth, sure moves; front-end design that combines strength with light weight; Ward Leonard variable-voltage control on electric-powered models for fast acceleration and deceleration.

Let us tell you more about how Bucyrus-Erie walking draglines put you out in front on the big-yardage jobs. Bucket capacities start at 4-cu. yds.

57/55

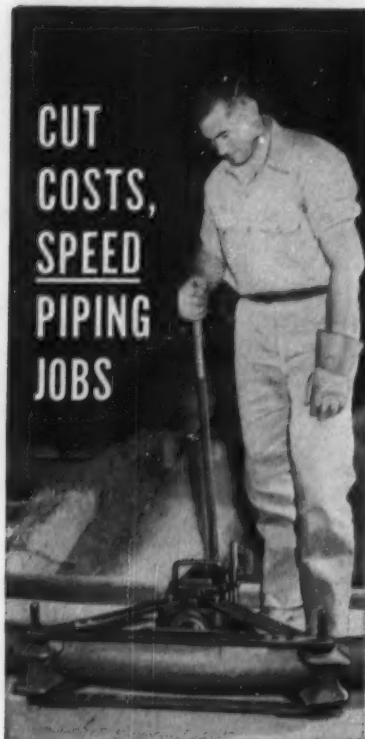
**BUCYRUS
ERIE**

South Milwaukee
Wisconsin

1880 **75** 1955

YEARS OF SERVICE
to Men Who
Shape the Earth

CUT COSTS, SPEED PIPING JOBS



...with Greenlee Hydraulic Pipe and Conduit Bender

Built for the tough jobs, the GREENLEE Bender saves hours, reduces costs on your pipe and conduit work. With a GREENLEE one man quickly makes bends in pipe up to 5", rigid and thin-wall conduit *right on the job*, exactly where and when needed. Many owners report time and labor savings of 50% or more... and the cost of many manufactured bends and fittings is entirely eliminated. Compact, portable, versatile to reduce your costs, eliminate construction delays, keep jobs rapidly moving along on schedule. Available in two sizes. Thousands in use by construction crews, electricians and plant maintenance departments. Often pays for itself on the very first job!

FREE BENDER BOOKLET with complete data and illustrations on GREENLEE line of hand and hydraulic benders for tubing, pipe and conduit. Shows how to do various bending jobs quickly and easily to cut job time, reduce costs.



GREENLEE TOOL CO.

2191 Columbia Ave., Rockford, Illinois

EQUIPMENT NEWS . . . Continued

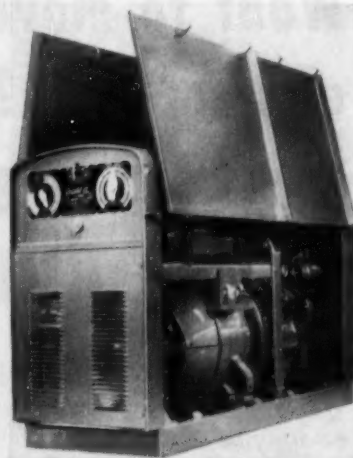


TOUGH DIGGER—The jeep-mounted Go-For-Digger has its digging action working over a spring-loaded boom that comes up against a shoe on the ground. This provides greater impact for digging hard materials such as shale. Ditching can be done close to walls or banks because the cutting attach-

ment will slide on tubes over to the extreme right. The material comes in to the hopper on a hydraulic conveyor and from there it can be deposited on either side of the machine. The machine can be set up for digging trenches from 6 to 16 in. wide to depths of 5 ft.—**A. J. Parsons, 80 W Maiden St., Washington, Pa.**



HARDFACING — Hi-C Ruf-Nek hardfacing paste, is said to impart an abrasion resistant finish to any metal whose melting point is higher than 1,850 deg F, the melting point of the paste. No special skill or equipment is required to apply it. Using gas flame, it can be applied to metal of less than 1/4-in. thickness, and with proper induction heating any thickness of metal can be hardfaced. A permanent suspension of powdered hardfacing alloy in a water base solution, the paste is deposited in a layer up to 3/4 in. on the surface to be hardfaced. Heating the base metal by flame or high-frequency induction to the fusion point of the paste causes it to bond to the base metal. The hardness of the treated surface ranged from 55 to 61 on the Rockwell C scale. Available in tubes or jars.—**R. E. Jones, Superweld Corp., 6840 Vineland Ave., N., Hollywood, Calif.**



DIESEL POWERED WELDER—The Shield-Arc SAE-250 is rated at 250 amp at 40 v, 60% continuous duty cycle. The welder is powered by a 4-cyl, 4-cycle Hercules DIX-4D diesel engine rated at 39 hp at 1,700 rpm. According to the manufacturer, the new welder is 1 ft shorter and weighs 20 lb less than a comparable 300-amp unit. The unit has an output range of 50 to 250 amp, and will handle electrodes from 1/16 to 1/4 in. in dia. The generator is equipped with power outlets providing 115 v, dc power for tools and lights.—**Lincoln Electric Co., Cleveland 17, Ohio.**

INSTANT POWER



for dependable ignition AMERICAN BOSCH MAGNETOS

Better to start with — best in the long run. That's the power-packed story of American Bosch Magnetos . . . today's finest ignition units. Many advanced features give them greater power for split-second starting and premium engine performance PLUS built-in stamina that assures years of constant, trouble-free service in construction equipment. That's why they're so widely used as original equipment by many leading engine builders.

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Components for Aircraft Engines



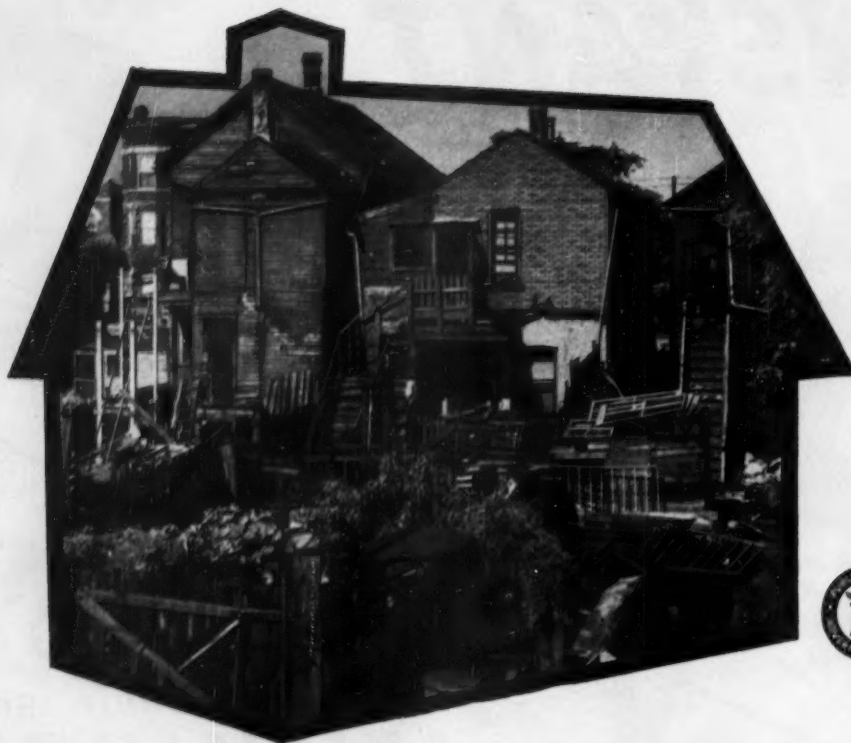
Small Electric Motors



Electric Windshield Wipers



Diesel Fuel Injection Equipment



We have a house to put in order...

WE HAVE A HOUSE to put in order . . . and it's the house where America lives.

Of our country's many million homes, more than 1 out of every 10 are out-and-out slums. Nearly one-half of all American dwellings are in poor to "fair" condition, and urgently need basic repairs.

Something *must* be done—both to correct the slums of today and *prevent* the slums of tomorrow.

How do slums start? Usually just one house starts to slide downhill and soon a whole block changes. Pride is lost. Other houses are neglected, decay spreads.

So the 20 million homes in need of basic repair and improvements deserve equal attention. The time to stop the spreading blight of slums is *before it starts*.

What's your stake in stopping slums?

If you think your town is different, just look around you . . . If you think slums only affect persons who live in them, think again.

Slums raise taxes and lower property values of the whole town. They raise rates of crime, delinquency and disease. *Everyone* has a real stake in stopping slums. And that includes you as a businessman.

Your firm is certainly dependent on the welfare of the community where you do business. But it's more than good business—it's good citizenship to take part in efforts aimed at civic improvements. It's the *responsibility* of every business.

What can your firm do? The answer to America's housing problems starts with individuals. But to roll back slums is such a big job it's going to take more than individual effort. It will need the cooperation of your business and many others.

Some slums should be torn down and a fresh start made. Others can be remodeled and made to conform to better living standards. So it is up to you to support every sound program which seeks adequate housing for all our people.

New help is now available

There is a new national, non-profit organization called A.C.T.I.O.N.—The American Council To Improve Our Neighborhoods—which is designed to help all individuals or groups interested in putting America's house in order.

Send for a free copy of "ACTION." It explains what A.C.T.I.O.N. is and proposes to do. It lists booklets, research, check-lists, and other material which can help you. Address P. O. Box 500, Radio City Station, New York 20, N. Y.



American Council To Improve Our Neighborhoods

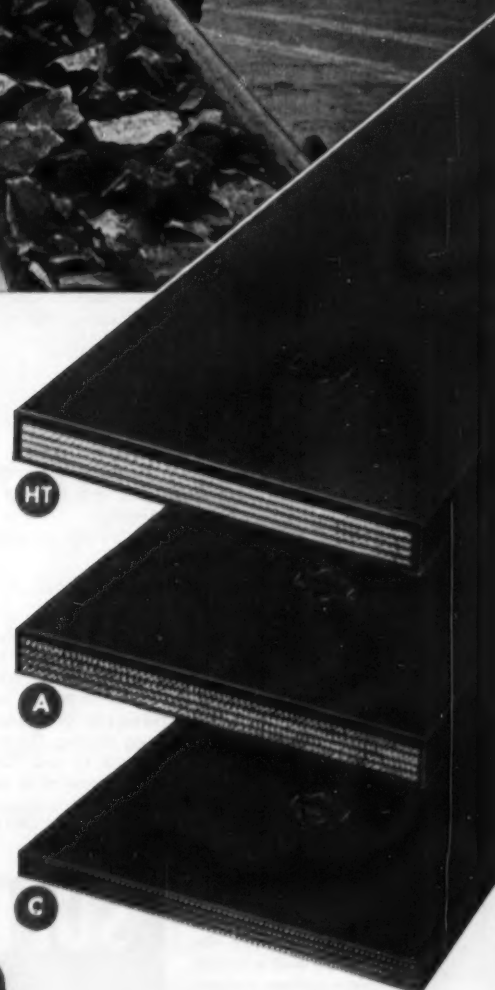


Thermoid Conveyor Belting cuts handling costs on every construction job



There's a Thermoid Conveyor Belt designed to lower your handling costs on every construction job. Here are three examples: **HT** For extremely abrasive materials such as granite, trap rock, flint rock, quartz ore; **A** For slag, lime rock, crushed stone and other highly abrasive materials; **C** For moderate abrasives such as sand, loam, soda, gravel.

Thermoid's exclusive impregnation process welds carcass and cover into an exceptionally strong, durable belt. Finest quality reinforcement and specially compounded rubber stocks assure long life... lower your handling costs per ton. There is a complete line of Thermoid Conveyor Belting, Hose and Multi-V Belts for every construction application. Call your Thermoid Distributor for information, or write direct.



Thermoid

Conveyor & Elevator Belting • Transmission Belting
F.H.P. • Multiple V-Belts • Wrapped & Molded Hose

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J. Nephi, Utah

When job conditions call for this type of Heavy-Duty Tie . . .

use **SUPERIOR** **TILT LOCK** **CLAMPS**

with **SPECIAL**
Safety-Type Handle
and Nut Washers



HANDLE WASHER

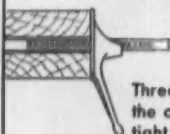


NUT WASHER

The malleable Handle Washer combines handle, washer and wrench—Designed for absolute safety, cannot fall off threads when load drops off or when handle is hit accidentally. The cast iron Nut Washer has all the features of Handle Washer except the open slot for use as wrench.

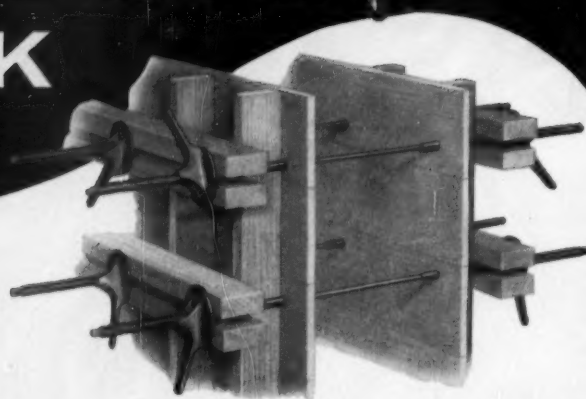


Washer, in tilted position quickly slips over stud rod threads to wedge and is seated.



Three full turns on the threads of the outside rod bring it flush and tight against the wale. When pointing upward, the handle may be hit accidentally or pressure released during pouring. This may cause the handle to turn 180°, but the safety feature of 3 complete turns makes it impossible for the clamp to fall off the thread.

Tilt Lock Clamp Assemblies may be rented with a ninety day option to purchase.



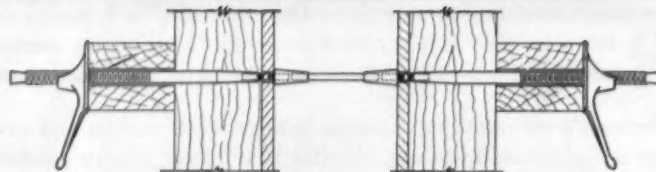
The "safety in use" of Superior's Handle and Nut Washers for Tilt Lock Clamps is shown at the left. The Tilt Lock Outside (Stud) Rods have outstanding features, too. The Outside Rod has $\frac{3}{4}$ " threads, five to the inch, rolled on a $\frac{3}{4}$ " high carbon rod. This compares with the $\frac{3}{4}$ " thread cut on a $\frac{3}{4}$ " rod usually supplied. Cold rolled threads are tougher, and therefore more resistant to damage, and their contour greatly reduces the clogging of concrete and facilitates cleaning.

The Tilt Lock Outside Rod has a heavy cold forged rectangular end section that is $\frac{3}{4}$ " wide and $\frac{1}{2}$ " thick, to which the Handle Washer is applied as a removal wrench. This forged section is practically indestructible, never becomes rounded after numerous reuses as does a milled end. Therefore, it is never necessary to use a Stillson.

Superior Tilt Lock Clamps are supplied with Outside Rods 16" long and 20" long, for both $\frac{3}{8}$ " and $\frac{1}{2}$ " inside tie rods. Extensions are available where field conditions require Outside Rods longer than 20".

Superior supplies high tensile inside rods with rolled threads. Form layouts and estimates are prepared from plans without charge or obligation.

with Cone Nuts for Spreader Action



Where it is desirable to use Tilt Locks with Superior Cone Nuts for spreader action or other reasons, Tilt Lock Rods are adapted for use with Cone Nuts as illustrated above.

SUPERIOR CONCRETE ACCESSORIES, INC.

4110 Wrightwood Avenue, Chicago 39, Illinois

New York Office

1775 Broadway, New York 19, N. Y.

Pacific Coast Plant

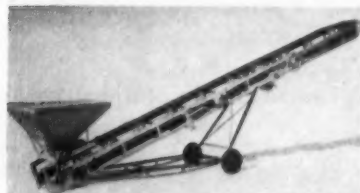
2100 Williams St., San Leandro, Calif.

EQUIPMENT NEWS . . . Continued

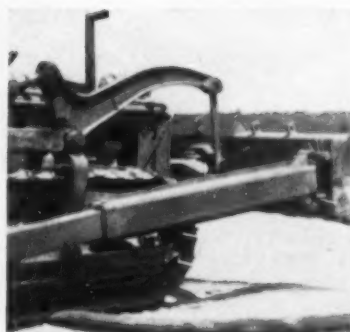


LOW-BOWL SCRAPER—A new crawler-drawn scraper has been added to Caterpillar's expanding line of earthmoving equipment. The No. 463 scraper, with a struck capacity of 18 yd and a heaped capacity of 25 yd, is the second largest scraper in the company's line. Like other Cat scrapers, the new model features the "low-bowl" design developed by company engineers to give the scraper a fast loading rate that continues to the end of the loading cycle. Lower sides of the scraper give less loading resistance because material in the bowl is not lifted so high and incoming material meets less overhead weight. Low lifting height also reduces internal friction. Adjustable rear axles provide clearance with whatever size tires are used. The cable-operated scraper has a load capacity of 55,000 lb. Dimensions are 38 ft long, 11 ft, 9 in. wide and 11 ft 1½ in. high with the blade on the ground. The wheelbase is 23 ft, 1½ in.—**Caterpillar Tractor Co., Peoria, Ill.**

CONCRETE FORM COATING—Easier stripping, less form maintenance, and fewer applications are claimed for a new concrete form coating and preservative. Only a certain amount of the coating penetrates wood forms to act as a preservative, while the remainder dries to a hard, clearly visible brown film. When the color fades, it's time to apply the coating again. Three applications will provide easy stripping for forms used 10 times, the manufacturers claim. On metal forms, the coating produces a hard, dry film that permits easy stripping and acts as a rust preventive.—**Stonhard Co., 1306 Spring Garden St., Philadelphia 23, Pa.**



CONVEYOR—A new line of troughed belt conveyors is available in sizes from 18 to 36 ft. Featuring capacities to 60 tons per hr of sand, gravel and other bulk materials, the units are available with either gasoline or electric drive.—**Chantland Mfg. Co., Badger, Iowa.**



TOUGH HOSE—A bulldozer will not make a lasting impression on a new type of "spring-back" water suction hose called Moredon. The spring-like action is accomplished by a continuous coil of hemp rope that is specially treated and imbedded in thick rubber. The hose is recommended for normal suction with working pressures ranging from 70 lb in the 1-in. size, to 40 lb in the 3-in. size. A corrugated cover of tough black rubber resists sun-checking, abrasion and the effects of aging.—**B. F. Goodrich Co., Industrial Products Div., Akron, Ohio.**



LOW COST PORTABLE HEAT saves time and money for contractors

For only a few cents an hour in fuel, you can dry plaster, fast, even on cold or humid days; pour and cure concrete safely at any temperature and keep men working, inside or out, in freezing weather. That saves hours of time . . . and time means money.

Your Master Heater rolls into place, starts at the flip of a switch. You don't need a vent. Three models put out 100,000; 160,000 or 400,000 BTU's per hour; burn inexpensive kerosene or fuel oil.

The low price is repaid time after time in hours saved and workmen working.

Write for full information or see your Master distributor.

MASTER VIBRATOR COMPANY
352 Stanley Ave., Dayton 1, Ohio

MASTER



Final step, laying the hot-mix Texaco Sand Asphalt wearing surface, in widening and strengthening five miles of U. S. Route 258 in Virginia.

Used by increasingly heavy truck traffic between tidewater Virginia and North Carolina, this 18-foot Virginia highway had become obsolete. How the State Highway Department widened and strengthened the narrow, rigid pavement will interest other engineers.

A "black base", consisting of hot-mix Texaco Asphaltic Concrete, was laid three feet wide and eight inches thick on both sides of the old pavement. This was followed by a binder course of finer graded Texaco Asphaltic Concrete, laid 24 feet wide in two layers. To complete the modernization project, a wearing surface of hot-mix Texaco Sand Asphalt was constructed approximately $1\frac{1}{2}$ inches thick.

An 85-100 penetration Texaco Asphalt was used in the "black base", the asphaltic concrete binder course and the sand asphalt wearing surface. Like all Texaco Asphalt Cements, Cutback Asphalts and Slow-curing Asphaltic Oils, it is produced from scientifically selected crudes. The uniformly high quality and dependability of these products have earned and held the confidence of America's road builders for more than 50 years.

Two helpful booklets covering all types of asphalt road and street construction can be obtained without obligation by writing our nearest office.

How Virginia modernized an out-of-date highway



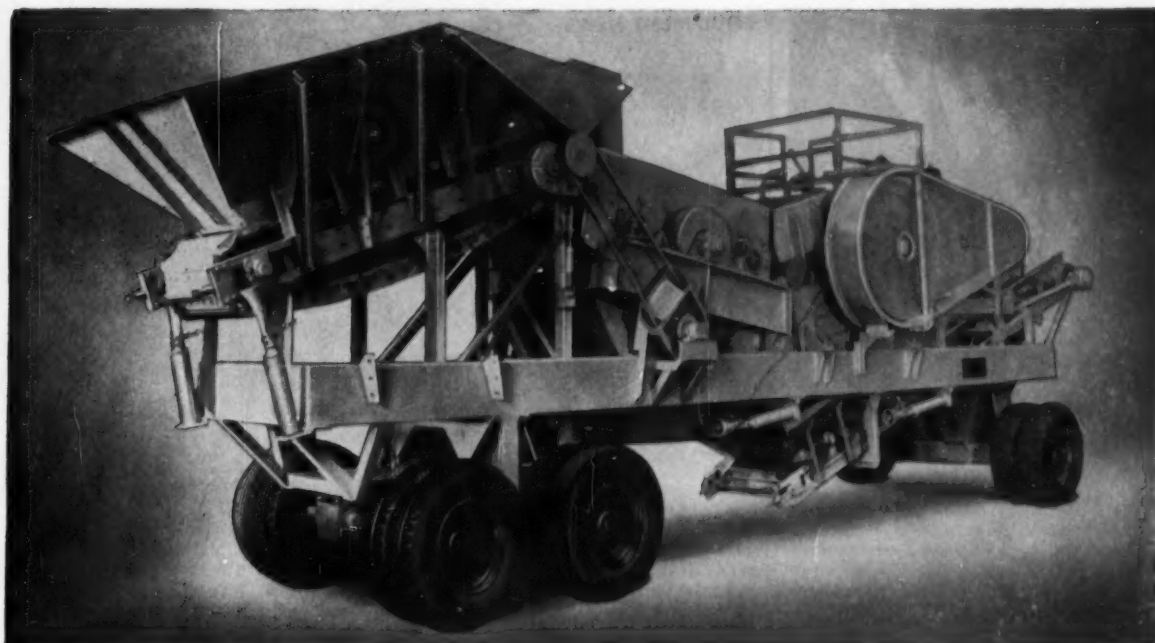
CONTRACTORS

Brown Paving Co., Lexington, N. C.
J. R. Ford Co., Inc., Lynchburg, Va. (asphalt)

THE TEXAS COMPANY, Asphalt Sales Div., 135 E. 42nd Street, New York City 17
Boston 16 • Chicago 4 • Denver 1 • Houston 1 • Jacksonville 2 • Minneapolis 3 • Philadelphia 2 • Richmond 19



TEXACO ASPHALT



Why this new primary rock buster breaks production records

● You've demanded it so here it is . . . PIONEER's new 150 PRS Primary Crushing Plant. This record breaker is completely portable and is designed either to work with a secondary plant or to be used alone for producing ballast.

Why Production Is High

The two-deck Mesabi screen, located between the apron feeder and the jaw crusher, is one reason why the 150 PRS is breaking production records. This screen removes and by-passes smaller sized material to the output conveyor so the jaw crusher receives only oversize for reduction. This feature increases efficiency of the jaw crusher and thus boosts output of entire plant, because both jaw and screen are utilized to full advantage.

The high capacity of this plant's big 2036 overhead eccentric jaw crusher

is another reason why production runs so high. It works on the forced-feed principle, made possible only with overhead eccentric crushing action. With each crushing stroke, the pitman crowds material down and through the crushing chamber . . . crushing at a rate of 250 strokes per minute. With this action you can take on even the toughest kind of crushing with assurance of high output.

Weights Only 56,000 Pounds

The 150 PRS consists of a 36" x 10' apron feeder, 4' x 6' Mesabi screen, 2036 jaw crusher, and conveyor, all mounted on a rubber tired chassis.

Yet, despite big units, it weighs only 56,000 lbs. less power. It's compact, too . . . only 38'5" long, 13'8" high and 8'6" wide when set up for operation!

For further information on the 150 PRS or other PIONEER Portable or Stationary Crushing and Screening Plants, write Pioneer Engineering Works, Inc., Minneapolis (Subsidiary of Poor and Company, Chicago).

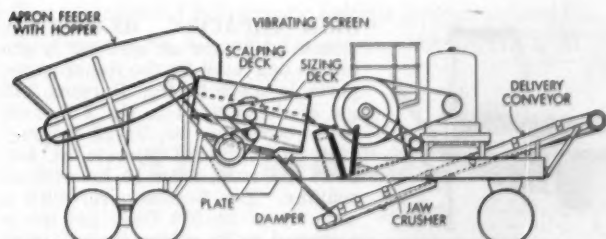
SPECIFICATIONS

Apron Feeder . . . 36" x 10' with forged steel pens	
Mesabi Screen 2-deck, 4' x 6'	
Jaw Crusher 2036" x 36"	
Jaw Crusher capacity 95-190 iph*	
Delivery Conveyor 30" x 18'	
Hp required 110 continuous at 1200 RPM	
Weight, less power 56,000 lbs.	
Travel height 12'7"	

*3"-6" setting. Varies \pm 25% according to material. To compute total plant output, add by-passed material.

Pioneer

Continuous EQUIPMENT



Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis 13, Minn.
Subsidiary of Poor & Company • Chicago
Please send information on equipment checked.

- | | | |
|--|--|--|
| <input type="checkbox"/> GRAVEL PLANTS | <input type="checkbox"/> WASHING PLANTS | <input type="checkbox"/> MECHANICAL FEEDERS |
| <input type="checkbox"/> ROCK PLANTS | <input type="checkbox"/> BITUMINOUS PLANTS | <input type="checkbox"/> VIBRATING SCREENS |
| <input type="checkbox"/> JAW CRUSHERS | <input type="checkbox"/> APRON FEEDERS | <input type="checkbox"/> BUZZER SCREENS (LIGHT DUTY) |
| <input type="checkbox"/> ROLL CRUSHERS | <input type="checkbox"/> DRUM FEEDERS | <input type="checkbox"/> CONTINUOUS CONVEYORS |

Name _____
Company _____
Address _____
City _____ Zone _____ State _____

WHY BUY LESS

...the best
costs so little



CM HOISTS AND PULLERS are ruggedly constructed to give you years of trouble-free service. Yet they are unusually light...easy to handle because they are constructed of the strongest alloys of steel and aluminum. Equipped with famous CM-Alloy flexible, welded alloy steel load chain.

CM CYCLONE

- Capacities from $\frac{1}{2}$ to 10 ton.
- 1-ton model weighs only 36 pounds.
- 96% efficient—easy to operate.
- Lifetime lubricated.



CM PULLER

- Capacities $\frac{1}{2}$, 1 $\frac{1}{2}$, 3 and 6 ton.
- $\frac{1}{2}$ -ton model weighs only 13 lbs.
- Lifts or pulls at any angle.
- Lifetime lubricated.

Write for catalog
and name of your
nearest CM dealer.



CHISHOLM-MOORE HOIST DIVISION

COLUMBUS McKINNON CHAIN CORPORATION
TOWANANDA, NEW YORK

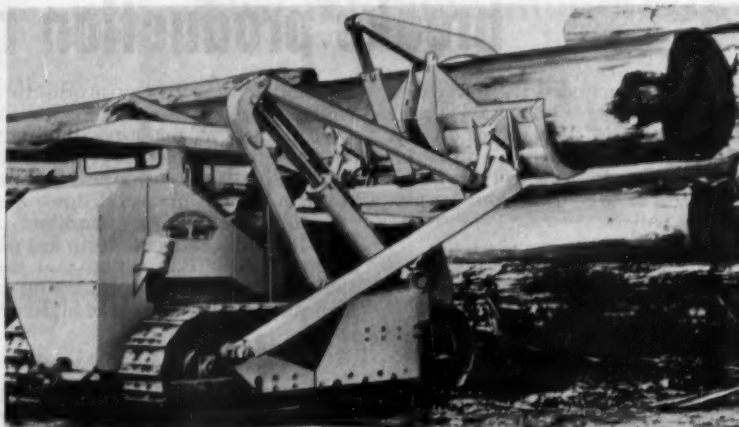
REGIONAL OFFICES: NEW YORK, CHICAGO, CLEVELAND
In Canada: McKinnon Columbus Chain Limited, St. Catharines, Ont.

EQUIPMENT NEWS . . . Continued



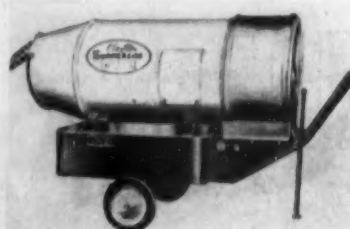
NEW PAYLOADER—Especially designed for stockpile work, the HAH payloader tractor shovel features front-wheel drive and rear-wheel power steering for fast maneuverability. With a capacity of $\frac{3}{4}$ yd struck and 1 yd heaped, the Payloader features a breakout force of 4,500 lb, with bucket breakout action that permits 40 deg of tip-back at ground level. The Payloader has a

7-ft 9-in. high lift, lifting capacity of 4,000 lb and carrying capacity of 3,000 lb. Torque converter drive and four-speed transmission are combined with a 57-hp gas engine that develops 14 mph in forward and 23 mph in reverse. Stability is increased with a new bucket arm design and a hydraulic accumulator that absorbs load shock.—Frank G. Hough Co., 706 7th St., Libertyville, Ill.

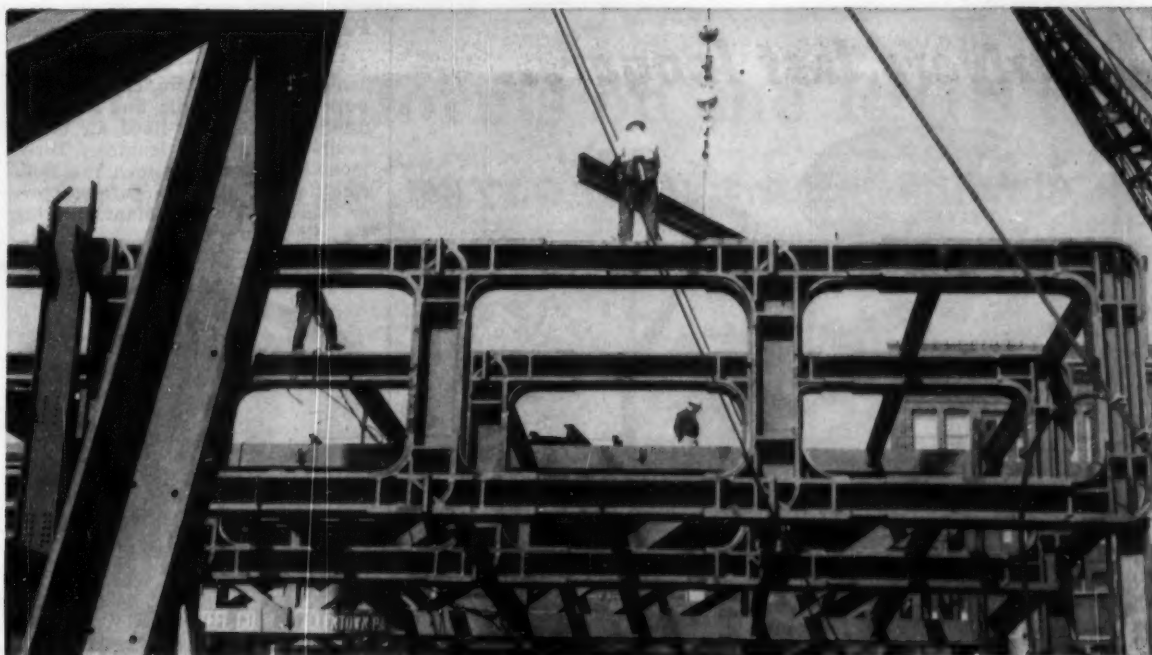


FRONT-END LOADER — Designed for mounting on 6-C, 7-C and 8-C hydraulically operated Austin Over-shoot Loaders, this new attachment consists of an open-end bulldozer blade on which is mounted a large steel hook actuated by a double-acting hydraulic cylinder. With this attachment, the unit can load piling,

large diameter steel pipe, timbers and culverts, as well as other materials. The loader is also available with a modified oil reservoir to permit the installation of a rear-mounted winch. The attachment is interchangeable with Austin bucket.—Austin Division, Central Ohio Steel Products Co., Gallon, Ohio.



HIGH-CAPACITY HEATER — A stream of heated air at 2,400 ft per min is delivered by the Summaira portable space heater. Burning 2.15 gal of cheap No. 1 or No. 2 fuel oil or kerosene per hr, its 25 gal fuel tank allows it to operate at full blast for more than 10 hr without refilling. The Summaira, with a capacity of 300,000 Btu's per hr, is equipped with safety controls that



Erecting half trusses weighing 50 tons with 35-ton derricks.

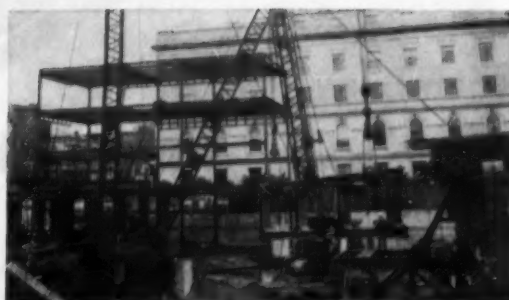
Welded design is answer to structural dilemma

EFFICIENT use of all welded Vierendeel trusses has solved a difficult framing problem on the new 2 million dollar library in Hartford, Connecticut.

The structure problem is spanning the Park River conduit with maximum utilization of space.

Five all-welded Vierendeel trusses carry the structure over the conduit. 104-foot spans carry the basement on the lower chord and the first floor on the upper chord. Subsequent floors are suspended from the roof structure.

Architects: Schutz & Goodwin, Hartford, Connecticut. Supervising architect for City of Hartford: Daniel Tasillo. Structural Engineer: Robert Loomis, Windsor, Conn. Structural Fabricators: Lehigh Structural Steel Co., Allentown, Pa. General Contractor: Wadhams & May Co., Hartford, Connecticut.



Welded steel framework for Hartford Public Library uses Vierendeel trusses. 192 feet long, 176 feet deep. Designed for 150 psf in storage area, 60 psf in offices.



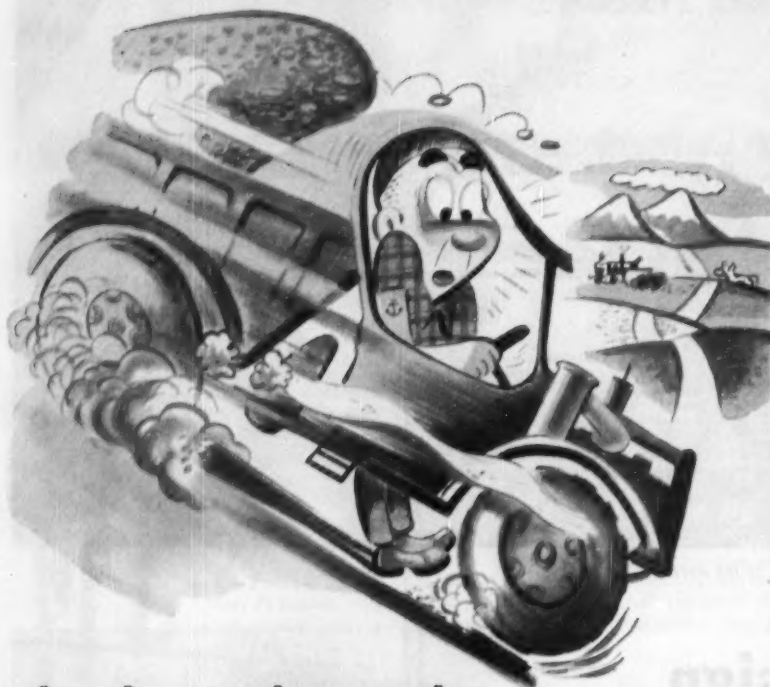
High speed welding of truss components.

THE LINCOLN ELECTRIC COMPANY

Dept. 2706, Cleveland 17, Ohio

The World's Largest Manufacturer of Arc Welding Equipment

Drivers last longer...



when heavy-duty trucks

use J-M Brake Blocks



Experienced operators know that when their vehicles are equipped with Johns-Manville Brake Blocks they can handle crushing loads without personal danger.

That's because these rugged, durable J-M Brake Blocks are engineered for the job... and designed for dependable performance plus maximum service life on trucks, shovels and heavy machinery.

They are "standard parts" on many famous makes of heavy-duty units. For fast, easy replacement, they are now available in Johns-Manville Assembled Sets that put new safety into your equipment.

See your Johns-Manville Distributor for data on J-M Brake Linings and Clutch Facings for industrial equipment, or write Johns-Manville, Box 60, New York 16, N. Y.



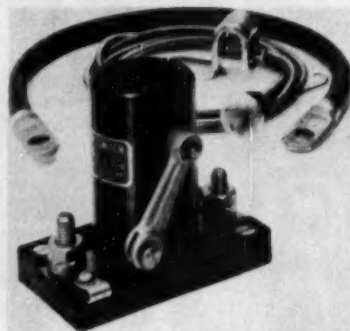
Johns-Manville Industrial Friction Sets are available in a wide range of molded or woven, rigid or flexible asbestos materials.



Johns-Manville
INDUSTRIAL FRICTION MATERIALS

EQUIPMENT NEWS . . . Continued

cut off the heater in the event of flame or power failure. The discharge outlet is 14 in. in dia, and it can be fitted with asbestos-lined air ducts, available in 10-ft lengths. Three models are available, including both electric- and gasoline-operated power sources.—Clayton Manufacturing Co., El Monte, Calif.



DISCONNECTS BATTERIES—An improved, heavy-duty Auto-Gard safety battery disconnect switch eliminates dead batteries due to electrical leakage, inhibits theft, and prevents electrical fires. It is especially suited to equipment that stands idle much of the time. Operated from the dashboard, it is installed between the battery and starter and when opened, isolates the battery from all electric circuits. Contacts are of the plunger type with a wiping action that insures a clean contact. There is no measurable voltage drop across the switch.—Jauco Sales, 500 Fifth Ave., N.Y. 36, N.Y.



BULK-MATERIAL HANDLER—The truck or trailer-mounted SF-5 bulk-material handler is available in lengths of 10 to 34 ft., with chain and flight or belt discharge systems. Hydraulic controls are operated from a rear-of-body position where one valve controls the speed of the body conveyor and the cross-feed auger and another valve controls the vertical and discharge augers. A hand-operated pump elevates the discharge stack. Discharge can vary from the ground to a height of 15 ft or more from the swivel conveyor. Rugged

The LINE forms on the RIGHT!

For these NEW **PAYLOADER®** tractor shovels

We anticipated some of this demand. . . .

But apparently not enough. . . .

We're increasing our production. . . .

We're expanding our facilities. . . .

However, since these new models out-produce and outperform other tractor-shovels, we expect the demand to increase even more. If you are interested in more production at lower costs, your future needs will probably include one or more of these new "PAYLOADER" models.

Because of the current demand we suggest you contact your "PAYLOADER" distributor *at once* and discuss your needs with him.

These new models have been designed and are being built by The Frank G. Hough Co. who introduced the first four-wheel-drive tractor-shovel and who have produced more unit-design tractor-shovels than all other firms put together.



model HU 1 cu. yd.



model HH 1½ cu. yd.



model HO 2 cu. yd.

The complete proven "PAYLOADER" line of tractor-shovels includes sizes ranging from 18 cu. ft. to 2 cu. yd. bucket capacity and available in four wheel drive, rear wheel drive and front wheel drive types. They are sold and serviced by the largest, most experienced Distributor organization in the business.



PAYLOADER®

MANUFACTURED BY
THE FRANK G. HOUGH CO., LIBERTYVILLE, ILL.

SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY



THE FRANK G. HOUGH CO.
706 Sunnyside Ave., Libertyville, Ill.

Send information on "PAYLOADER"

☐ model HU ☐ model HH ☐ model HO

Name.....

Title.....

Firm.....

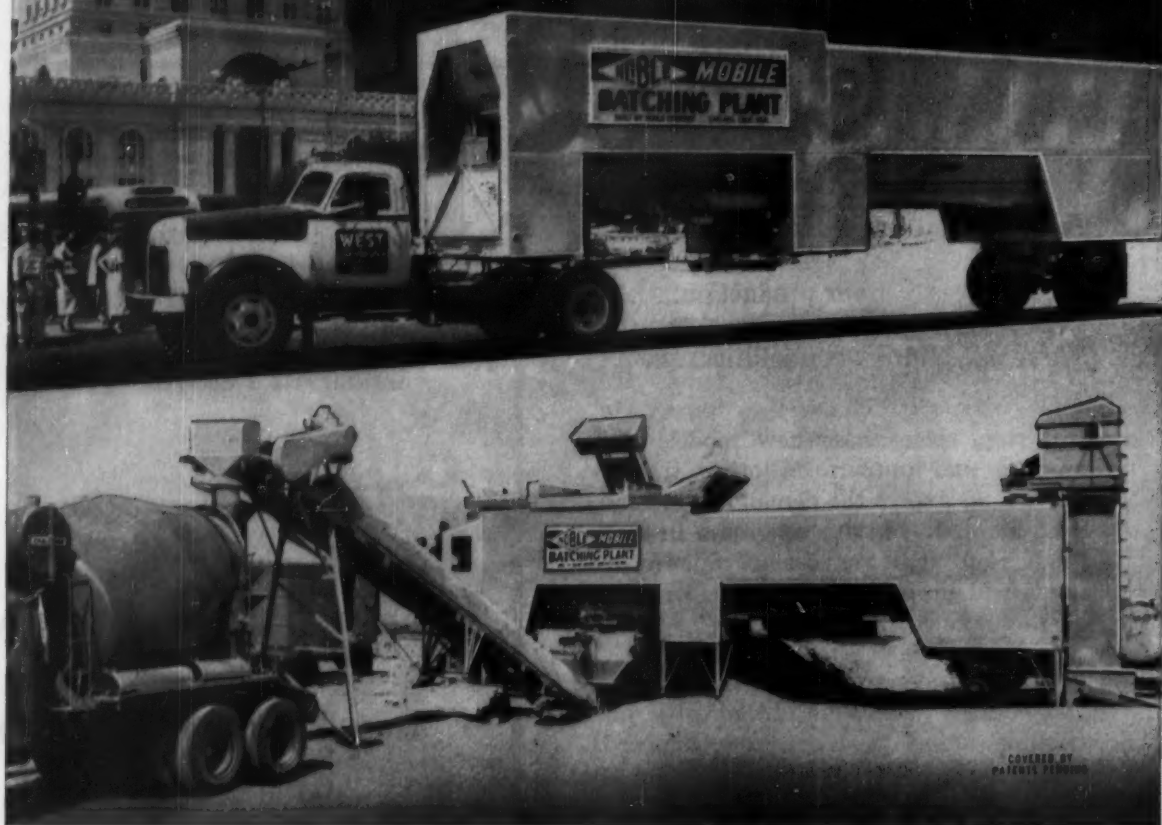
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City.....

State.....

NOBLE-MOBILE

"Batching plant on wheels"



**the complete plant that saves erection costs...
drive it to the job site and start batching!**

Noble-Mobile lets you batch at the job site proper where shorter hauls result in greater capacity. You go quickly into production . . . no footings, crane or electrical wiring required.

Noble-Mobile utilizes bulk cement. Aggregates charged with scooploader, conveyor or clam-shell. 60 yards per hour or more output to truck mixers. Noble-Mobile drives the highways within legal limits. No special permit required.

**NOBLE
BATCHING
PLANTS**

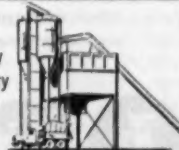


Noble-Mobile

Portable
or semi-
portable
plants



High
capacity
stationary
plants



• **DESIGNERS AND BUILDERS** •

NOBLE COMPANY

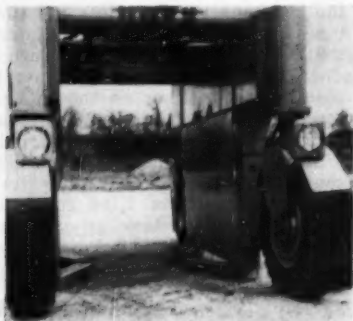
For further details phone, write or wire 1860 7th Street, Oakland 20, California, TEmplebar 2-5785 • 20950 Center Ridge Road, Cleveland 16, Ohio, EDison 1-3426

EQUIPMENT NEWS . . . Continued

drag-chain conveyor construction, a spur gear train and sturdy chain and sprocket drive for cross feed are additional features.—Baughman Mfg. Co., Jerseyville, Ill.



WATER-COOLED PUMPER—A 4-in. pumper powered by a Continental F-140 water-cooled engine that develops 30 hp at 2000 rpm can pump up to 40,000 gal an hr, according to the manufacturer. Like other Dual Primers, the new model 40M features dual volutes for rapid priming and a self-adjusting shaft seal that accommodates both pressure and vacuum.—Construction Machinery Co., Waterloo, Iowa.



PIVOTING LOAD HOOKS — A straddle carrier with load hooks that pivot inward to permit carrying loads without bolsters has been introduced. In place of the conventional rigid load hooks, the new carrier has four forks, two on each side, that swing in at right angles and meet in the center to form two arms under the load. Pivoting is controlled by hydraulic cylinders actuated by a lever on the left side of the driver's seat. Since the hooks extend under the full width of the load, no bolsters are necessary and skids or stringers are required only at the pick-up and delivery points. The Series 81 Pivoted Hook carrier is built on a frame with a capacity of 20,000 lb. It fea-

COMPARE PAYLOAD COST —and you'll buy LaCrosse!



Up to 1-ton more
legal payload capacity

Trailer Model	LaCrosse DF6T 20-Ton Drop	Mfr. A 20-Ton Drop	Mfr. B 20-Ton Drop	Mfr. C 20-Ton Drop
Gross Weight	8000 lbs.	9500 lbs.	9850 lbs.	10,000 lbs.

Up to 38%
lower trailer cost

Trailer Model	LaCrosse DF6T 20-Ton Drop	Mfr. A 20-Ton Drop	Mfr. B 20-Ton Drop	Mfr. C 20-Ton Drop
List Price FOB Factory	—	38% more*	35% more*	36% more*

*Based on latest available published prices.

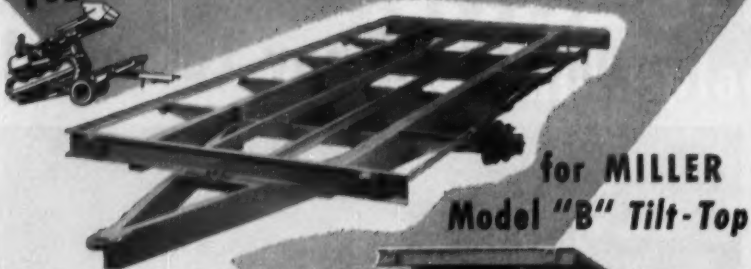
Note that LaCrosse low-beds weigh from 500 to 2000 lbs. less than competitive units, depending on model. This important weight advantage—achieved by patented frame design and elimination of heavy castings—lets you haul up to a full ton more legal payload per trip. It also saves wear and tear on your truck, tires and trailer on "empty runs" . . . gives you more miles of trouble-

free service. Best of all, LaCrosse's increased trailer volume and advanced modern facilities make it possible to give you the strongest, best-built trailer on the market—at savings up to 38% in first cost. Wide choice of models—from 6 to 75-ton capacity—with flat, drop or tilting platforms. Write for FREE descriptive literature. LaCrosse Trailer Corp., Gould St., LaCrosse, Wis.

LC-32

LaCROSSE
America's Favorite LOW-BED TRAILER

NEW "EDG-SUPPORT" frames



for MILLER
Model "B" Tilt-Top

Now more than ever, Miller Tilt-Tops are built to take it—built to last! As any contractor knows, heavy crawler tractors concentrate the load along the edge of trailer platforms imposing heavy strains on the overhang section. The NEW Miller frames offset such strains with new, taper formed extension members. Integrally welded to the main side channels, these members extend the full capacity of the main channels out under the entire edge of the platform.

Best of all, these new massive Tilt-Tops are now available at no increase in price . . . provide the same easy loading and better maneuverability for which MILLER Tilt-Tops have become famous . . . see them at your Miller distributor today!

✓ built best
✓ priced best

Model "B" 10 ton \$1175*

Optional equipment (priced extra)
16' long platform (8'x14' standard),
hydraulic tilt control, 2 speed hand
winch and electric brakes.

*Plus freight and Federal Tax.

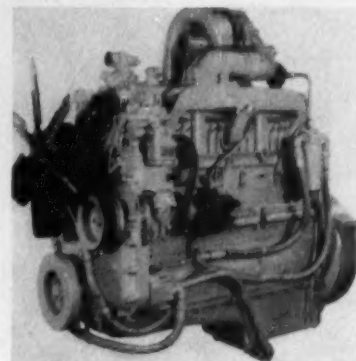
MILLER
research engineers



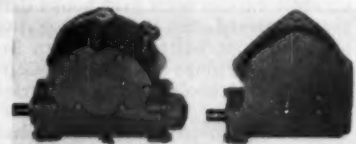
457 S. 92nd St., Milwaukee 14, Wis.

EQUIPMENT NEWS . . . Continued

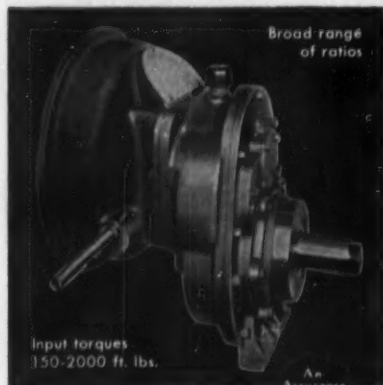
tures road speeds up to 40 mph, four-wheel steering, and four-speed transmission. It is available in six models capable of carrying loads ranging in height from 48 to 66 in., and widths from 40 to 52 in.—Ross Carrier Div. Clark Equipment Co., Benton Harbor, Mich.



NEW DIESELS—Turbocharging, the harnessing of exhaust gases that are normally wasted, produces an extra 50 hp on the NTO-6 and NT-6 Turbo-diesel engines. Both are six-cylinder, four-cycle engines with a bore and stroke of 5½x6 in. and a piston displacement of 743 cu in. Compression ratio for both engines is 15.5 to 1, and both weigh 2,546 lb. Essentially of the same design as the 200-hp NH600 diesel, the new 262-hp NTO-6 and the 250-hp NT-6 receive their increased power with the addition of the turbocharger, a simple gas turbine located in the exhaust system that puts exhaust to work. Turbochargers on the new models are available mounted either on the side or top, according to requirements. Features of the new Turbodiesels include a fully counterbalanced crankshaft that is drop-forged from alloy steel, maximum speed of 2,100 rpm, the new PT fuel system as standard equipment, and a circulating, centrifugal type of water pump. Electrical equipment is handled by a 12/24-v system—Cummins Engine Co., Inc., Columbus, Ind.



HYDRAULIC STEERING—A direct-acting hydraulic power steering gear will replace many standard cam and pin units with only minor design changes. The Sheppard power steering gear has mounting dimensions identical to those of the Ross manual gear with which it is interchangeable on the Sheppard SD-4 diesel tractor. It will fit equally well on any other



Special heavy-duty

- Transmissions
- Reduction Units
- Mechanical Drives for Torque Converters

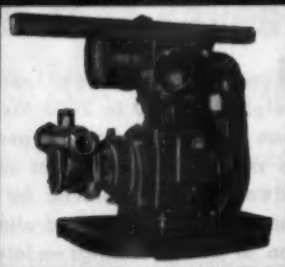
Cotta Transmission Co., Rockford, Illinois

COTTA
HEAVY-DUTY
TRANSMISSIONS

"Engineered-to-order"

WATER MAIN PRESSURE TEST PUMP

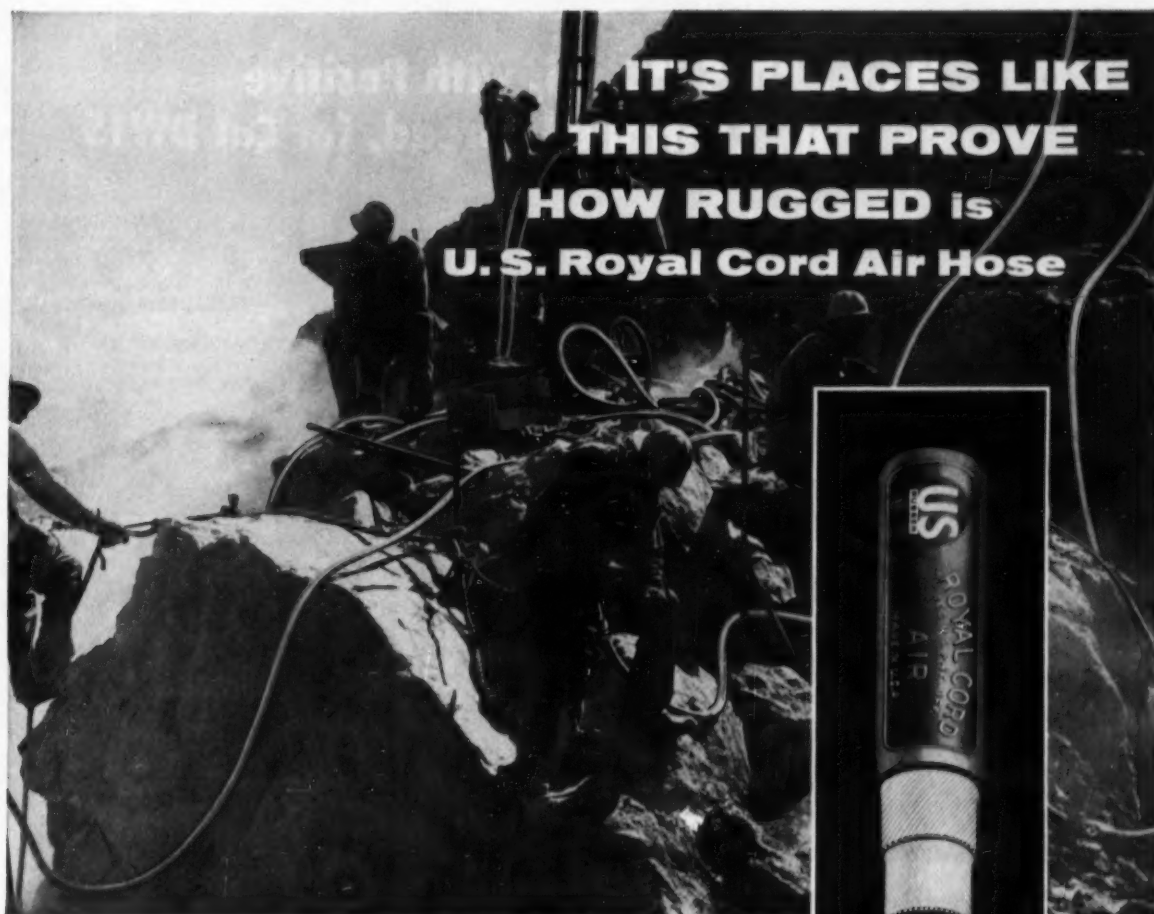
PORTO PUMP A ROTARY, RUBBER GEAR PUMP MECHANIZES AND EXPEDITES THE PRESSURE TESTING OF WATER MAINS AND FIRE SPRINKLER INSTALLATIONS.



Quickly develops required testing pressure up to 200 PSI powered by dependable 4 cycle gasoline engine, weighs 95 lbs., only one man required for pump operation, saves time and labor, increases profits—also excellent for jetting operations, core and exploratory drilling operations, cleaning transit mix cement trucks and dirty equipment, wetting down poured concrete structures, such as bridge supports, and various other applications requiring a portable pressure pump.

Dealers Inquiries Invited

PORTO PUMP, INCORPORATED
227 IRON STREET DETROIT 7, MICH



It's built like a tire!



That's right! U.S. Royal Cord is built like a tire... *it has to be*, to take the battering it gets on all kinds of jobs, under extreme pressures. U.S. Royal Cord is hit by rocks in blasting; heavy tools fall on it; trucks and other vehicles roll over it; workmen pull it over jagged rocks. But U.S. Royal's unique cord construction, borrowed from "U.S." tiremakers, lets U.S. Royal come through unharmed. Needs no cribbing. Despite its great strength, this hose is very light and flexible.

- Tube of high quality neoprene for maximum oil resistance.
- Braided cotton breaker ply anchors tube to carcass everlastingly.

- *Exclusive:* Two counter-spiraled plies of tough special yarn floated in resilient rubber for outstanding strength, shear resistance and flexibility.
- Tough, brown, natural rubber cover (strongest ever put on a molded hose) gives excellent cut and abrasion resistance.

Buying second-rate, short-lived hose is no short-cut to economy. Get "U.S." quality hose for the biggest savings. No matter what your hose problem may be, "U.S." can solve it. Get in touch with any of United States Rubber Company's 27 District Sales Offices or write address below. You will obtain the correct job-engineered hose, and the guidance and advice of an expert staff of "U.S." engineers.



"U.S." Research perfects it... "U.S." Production builds it... U.S. Industry depends on it.

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

Hose • Belting • Expansion Joints • Rubber-to-metal Products • Oil Field Specialties • Plastic Pipe and Fittings • Grinding Wheels • Packings • Tapes
Molded and Extruded Rubber and Plastic Products • Protective Linings and Coatings • Conductive Rubber • Adhesives • Roll Coverings • Mats and Matting

NOW Model RD15 Movall, with Positive Ejection, Controlled Spread, for Cat DW15



This rugged wagon hauls 16 heaped yards (18 struck or 22 tons). It works off standard Caterpillar controls, has "dozer-type" ejector that gets rid of loads with a positive, 140,000-lb. push.

Like larger Movall, the Model RD15 can dump at controlled rate into grizzlies or hoppers.

NEW C & D MOVALL MODEL RD15 for hauling rock, dirt, mud or any other top loaded material is designed especially for Caterpillar DW15 Tractors, both new and old; under favorable working conditions it also can be used with Cat DW10 Tractors. Like the larger, job-proved 25-yard Movall, the Model RD15 operates off standard Caterpillar controls, works interchangeably with scrapers, is simple and easy to operate. There's nothing new to learn.

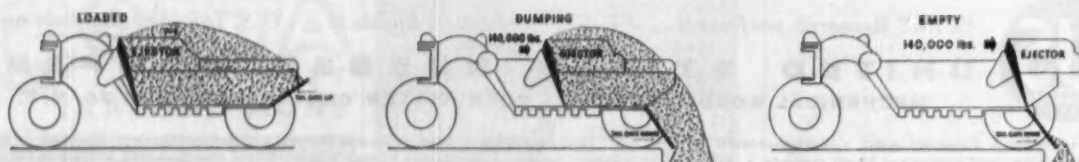
"DOZER-TYPE" EJECTOR PUSHES LOADS OUT QUICKLY—with a powerful, positive force of 140,000 pounds. This cleans the haul unit completely whether you're hauling dirt, rock, mud, gumbo, or frozen ore. There's no build-up or double hauling of sticky material, or time wasted cleaning. The "scraper-in-reverse" design, available only on C & D Movalls, also allows

you to place the load anywhere and in any manner you want: over the edge of fill; spread in even lifts of any desired depth; or dumped into hoppers at a controlled rate.

HANDLES ANY MATERIAL YOU CAN TOP LOAD with a shovel, drag line, or belt. You have a large loading target of 10' x 16' and short turning width of 27'. You get capacity loads every trip—tailgate minimizes spillage while loading, and during haul. Heaping loads are ejected over a fill in only 11 seconds.

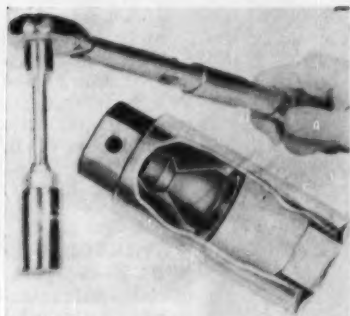
ASK YOUR CATERPILLAR-C & D DISTRIBUTOR FOR A DEMONSTRATION on your job. Find out what a C & D Movall can do for you. Call him NOW or write direct to C & D Manufacturing Co., Perkins (near Sacramento), California. Phone Hillcrest 5-8592.

HOW IT WORKS—Movall uses standard cable scraper power control. To dump, operator releases back-haul drum to drop tailgate, engages ejector drum. Eight-part ejector line gives 140,000 lb. push to boost load out fast and clean. Operator has complete control of discharge, controls spread depth by varying travel speed. After dumping, backhaul line closes tailgate and rolls ejector to loading position.



EQUIPMENT NEWS . . . Continued

equipment currently using the same manual gear. An outstanding feature is the elimination of a separate oil reservoir tank. The unit attaches directly to the suction and discharge connections of a hydraulic pump, and the oil reservoir is an integral part of the gear housing itself. The hydraulic gear is available at a standard ratio of 10 to 1 and with built-in mechanical steering in case of hydraulic power failure. Power steering substantially reduces operator fatigue and increases maneuverability.—R. H. Sheppard Co. Hanover, Pa.



SPARK PLUG SOCKETS—Sockets fitted with a patented rubber insert provide a means of removing and installing plugs in hard-to-reach places on many V-8 overhead valve engines. The sockets, available for $\frac{3}{8}$ -in. and $\frac{1}{2}$ -in. drives, hold plugs securely and eliminate the danger of burning the hands on hot manifolds. They have a $\frac{3}{4}$ -in. male plug at the top that allows the sockets to be turned with an open end or box wrench and can be fitted to extensions so that they can be turned by a ratchet-head or other torque wrench. They are especially helpful when removing or installing the newer gasketless plugs.—Plomb Tool Co., Los Angeles, Calif.

WELDING EQUIPMENT—Three new welding heads and two new power sources feature the latest line of Lincoln equipment for hidden or submerged arc welding. The new heads, LAF-3-4-5, offer to users a choice of ac or dc for field or shop welding. They can be universally positioned in any angle in three dimensions and off-centered for round-about welding, and can also be positioned on seam while welding. Fine vertical adjustments up or down are made by a simple hand-screw. A new Lincoln power source, giving 750 amp continuous duty ac power, has been added in the ac-750. It features a power-driven reactor control for setting current from remote switches on the welding head control box. Another new power source is the dc-750, a motor generator machine specifical-



New "geodetic suspension" provides two-way protection

It has been proved that most fatal head injuries are caused by shock to the brain rather than injury to the skull. As a result, Cornell Aeronautical Laboratories patented this new type suspension for industrial safety hats.

This new feature is available only in WILLSON "SUPER-TOUGH" SAFETY HATS AND CAPS.

It affords extra comfort as well as maximum

protection . . . *inside and out*! For example, a blow no longer concentrates its force on a small area at the crown of the head. Instead, "geodetic" crown straps are so located that the force of the blow is dispersed over the entire head area!

Moreover, a pneumatic cushioned sweat-band makes the tough Fiberglas hat shell safer—more comfortable, too, because a series of metered, inter-connected air cells team up to absorb the force! Get complete details. Send coupon below for latest bulletin.

—Clip and mail coupon for latest head safety information.—

Please send me your bulletin on the new Willson Super-Tough® Hats and Caps with "geodetic" crown straps and "pneumatic" headband.

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COMPANY _____

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More Than 300 Safety Products



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NOW! Two Gas Salamanders by JACKSON INSTANT HEAT...



MODEL 750

Portable **Low Cost Heat**
Compact **No Fumes**
Efficient **Clean**
Instant Heat **Easy to Service**
Rugged Construction

RIGHT WHERE YOU WANT IT!

Ideal for construction, warehouses, mills, and foundries, industry and emergency heating. Uses Liquified Petroleum (L/P) bottled gas to produce an even heat which is deflected along floor (with no hot spot under heater) by a special, dual-purpose shield. Equipped with Underwriter Approved low-pressure regulator and colored hose assembly with fittings. Automatic Safety Shut-Off Control stops flow of fuel when flame is extinguished. Inside baffle for hotter flame, more efficient use of fuel. Inexpensive to operate—simple to service. Model 500—50,000 BTU per hour, Model 750—75,000 BTU per hour.



JACKSON

MANUFACTURING COMPANY

HARRISBURG, PENNSYLVANIA

Oldest and largest wheelbarrow maker in America

you play it

SAFE

with

Safety-Pulls



Coffing Safety Pull
Ratchet Lever Hoists
2 coil chain models,
½ and 1½ tons
10 roller chain models,
¼ to 15 tons



Quick-Lift Electric Hoists
Hoist-Alls • Mighty-
Midget Pullers
Spur-Geared Hoists
Differential Chain Hoists
I-Beam Trolleys
Load Binders

Just as important as the time- and labor-saving advantages of Coffing Safety-Pull Ratchet Lever Hoists is the way each one protects your men from injury... your equipment from damage. Here's why:

Load cannot slip even if handle is accidentally released — because of dual Ratchet and Pawl principle, developed by Coffing and an outstanding Coffing advantage for over a quarter of a century.

Load is held positively at all times — there is no friction brake to slip or freeze.

Hooks will not break or straighten out.

"Safety-valve" handle will bend before any other part of hoist gives way.

Safety-Pulls are single-chain tested at 100 percent above warranted, rated capacity.

Find out more about how Coffing Safety-Pulls provide extra protection on the job. Write for Bulletin DSP.

Coffing Hoist Division

Duff-Norton Company

Danville, Illinois

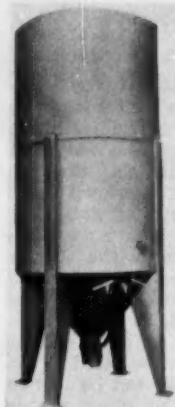
EQUIPMENT NEWS . . . Continued

ly designed for automatic welding. It is rated at 750-amp continuous duty at 40 v. It can also be paralleled with a second dc-750 for work requiring higher amperages.—Lincoln Welding, Lincoln Electric Co., Cleveland, Ohio.



SMOKELESS SALAMANDER

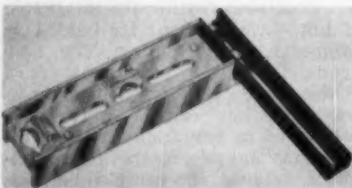
—A new salamander burns less than a gal of fuel an hr, delivers up to 175,000 Btu's. The principal feature is a circulator which drives the heat streams twice through the flames to give a high Btu delivery and little smoke. — C. R. Daniels, Inc., Daniels, Md.



STORAGE HOPPER

—An all-steel bulk storage unit will keep free-flowing materials stored at the job site in good condition. Available in 10- or 25-ton capacities, the unit has a hopper bottom with a swing control gate for effective discharge control. The bin is made of 12-gage steel with 16-gage steel used

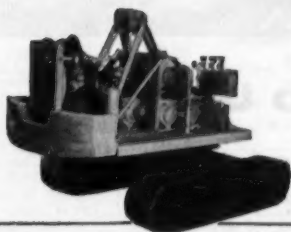
for the top and is loaded through an 18-in manhole in the top. The unit comes in one piece, eliminating the need for assembly.—Andrews Machine Co., 359 E. Main St., Decatur, Ill.



SQUARE AND LEVEL — The M-D Squar-Evel can be converted from a level to a square with the turn of a screw. Tool consists of an extruded aluminum 10-in. I-beam with Pyrex level and plumb vials and a slotted blade that slides out to set at either 45 or 90 deg.—Macklanburg-Duncan Co., Box 1197, Oklahoma City, Okla.



You get 7 tons of extra quality in the MICHIGAN 1/2-yard Crawler!



Compare specifications
point-by-point—you'll call the
MICHIGAN C16 your "best buy"

POWER CONTROL
INDEPENDENT TRAVEL
CAST STEEL DECK
POWER LOAD LOWERING
SIX HOOK ROLLERS
SEGMENT DISC CLUTCHES
CAST STEEL CAR-BODY
20" TRACKS STANDARD
30" TRACKS OPTIONAL

MICHIGAN is a registered trade
mark of Clark Equipment Company

Have you ever compared a 1/2-yard crawler to a 1/2-yard truck-crane, as to design and construction? It's a smart way to buy, when you're in the market for a crawler—a good way to make sure you're getting the best value for your money.

Are these two—crawler and truck—the same as to their upper mechanisms? They are if they are Michigans—identically the same operating mechanisms, to the last bolt and nut, in the Michigan C-16 Crawler, rated 8 tons, and the Michigan TLDT-20 truck model rated 15 tons.

Seven tons of extra built-in quality for every user who picks a Michigan C-16 Crawler! You get the same rugged cast-steel machinery deck as the 15-ton truck crane; the same six big ball-bearing mounted hook rollers; the same air-powered clutches for fast precision operation. Right down the line, every part has that extra work-capacity!

Make your own point-by-point comparison—it will prove that the Michigan C-16 Crawler has *more "big machine" features as standard equipment than any other 1/2-yard crawler*; will prove that dollar-for-dollar you get more in the Michigan C-16.

See this outstanding machine in action—call your Michigan dealer or write us.

**CLARK
EQUIPMENT**

CLARK EQUIPMENT COMPANY
Construction Machinery Division
380 Second Street, Benton Harbor 33, Michigan
Phone: WA 6-6184



Two New Expressways to Untie Traffic Congestion in Detroit

Completion of two new expressways criss-crossing downtown Detroit will relieve the urgent traffic congestion problem in that city's metropolitan area. In addition, the expressways will greatly reduce time and inconvenience in traveling to and from the suburbs.

The John C. Lodge Expressway will run north from Jefferson Avenue for a distance of nine miles. The Edsel Ford Expressway will extend fourteen miles from the western to the eastern city limits.

Both expressways are designed to carry all types of traffic, with a capacity of 9000 vehicles per hour. Cross traffic is carried on overhead bridges, and there will be no traffic lights or grade intersections. The new highways have a

minimum of three 12-ft traffic lanes in each direction, a 14-ft medial strip, two 8-ft refuge lanes, and two 30-ft service drives where necessary. Interchange ramps are placed at approximately ¼-mile intervals.

Bethlehem supplied steel for various already completed sections of the Ford-Lodge Expressways, and is in addition supplying steel for other portions now under construction. Among the Bethlehem steel highway products being used in the expressways are dowel units, reinforcing steel, and structural steel for bridges and overpasses.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL



Here are important facts
for the "man behind the gun"



This White 18" Dumpy level has
**...more of the
features you want,
yet costs you less!**

Before you buy, compare this White Dumpy level with a similar model of any other recognized make. From every standpoint — design detail . . . quality construction . . . work-speeding, life-lengthening features and cost — you'll quickly see why a White's the best buy you can make. It will make your work faster, easier, more accurate. Check this comparison chart:

FEATURES	D. White No. 7080	Instrument	
		A	B
Magnifying power of telescope	35X	30X	27X
Distance away you can read 1/100 ft. graduation	1200 ft.	1050 ft.	900 ft.
Diameter of objective lens	1.81 in.	1.485 in.	1.09 in.
Field of view (in minutes of arc)	64'	52'	60'
Coated optics	YES	YES	YES
Covered leveling screws	YES	YES	YES
Can you easily replace worn leveling screws in the field?	YES	NO	YES
Sensitivity of level vial (in seconds of arc per 2mm of graduation)	20"	20"	25"
Price — complete with carrying case, tripod and accessories — F.O.B. factory	\$305.00*	higher	higher

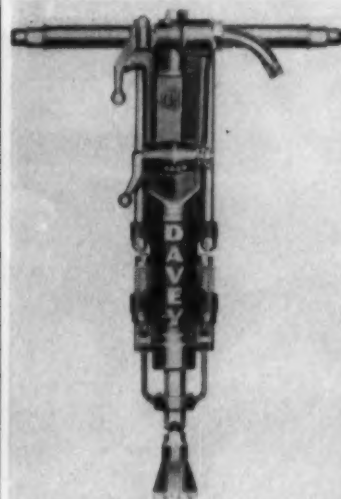
For complete details on the 18-in. Dumpy level and other equally fine engineering instruments, see your David White dealer, or write direct to DAVID WHITE CO., 339 W. Court Street, Milwaukee 12, Wisconsin.



We offer complete, expert repair service on all makes, all types of instruments.

*Price subject to change without notice.

EQUIPMENT NEWS . . . Continued



ROCK DRILL—A new heavy-duty, minimum-weight rock drill, designated Model DS-38, is said to be actually a 4-in.-1 drill. With the addition of a few parts it can be converted from blower to blast types, wet type with manual water valve or to wet type with auto-water valve. Three rotation speeds—average, fast or slow—can be furnished. Five sizes of collar shank chuck are available. An outstanding drill feature is said to be the use of pneumatic pawls in the rotation ratchet instead of the commonly used mechanical pawls. These are pushed out of engagement with the ratchet teeth at the time the ratchet starts to turn, thus eliminating rubbing wear on the pawls. Net weight of the machine with 1-in. chuck is 40 lb. Length is 21 in.—Davey Compressor Co., Kent, Ohio.



HITCHHIKER — A two-axle, four dual-wheel trailer dump that tows behind heavy-duty dump trucks is offered in body lengths of 15 or 16 ft with payload capacities of 10 to 20 yd. All models are equipped with the Duo-ram hoist of 18-ton capacity. Called the HH Hitchhiker line, they are constructed of closely spaced 4-in. channel cross-members welded on 5- to 7-in. I-beam longitudinals. Heavy-duty steel chassis and leaf-spring suspension are standard. A selection of tire sizes, brake types, axle capacities and other optional equipment is offered.—Gallion Allsteel Body Co., Gallion, Ohio.



FOR A MOBILE EMERGENCY RIG

WHEN machinery, trucks or tractors get mired, stuck or submerged valuable equipment is idle or endangered . . . and that costs money. With a tractor-mounted Carco winch on the job you can move to the trouble speedily. The added "reach" of the Carco winch line lets you get to the equipment to be rescued. And the rugged pulling power of the Carco winch . . . double the drawbar pull of the tractor itself . . . does the rest of the job. Carco winches are engineered for rough, tough work . . . long wearing, constant mesh gear trains transmit tractor power efficiently . . . brakes hold firm . . . concealed cable controls eliminate exposed levers and rods. See your nearest Carco dealer. PACIFIC CAR AND FOUNDRY COMPANY, Renton, Wash. Branches at Portland, Ore., and Franklin Park, Ill.



WINCHES
For All Industrial
Tractors





"Baby Digger" truck loads in close quarters—has big capacity, digs 10"-20" wide, down to 5' deep

This East Ohio Gas Company job, the replacement of a main extension, shows why the Cleveland Model 92 "Baby Digger" is so widely used for city digging. The "92" puts the edge of a trench within 17 inches of a parallel wall, loads excess spoil directly into trucks at the curb, and affords the operator full visibility of the whole job.

Compactness, maneuverability, speed combinations, capacity—if most of your trenching jobs

are city jobs, the "92" is the trencher for you!



And does it get around! The "92" hustles safely from job to job... at legal limit speeds... because it's so easily portable on the drop-axle, tilt-bed Cleveland T5 Trailer.

Your local distributor will show you how Cleverlands do more—for less
THE CLEVELAND TRENCHER COMPANY • 20100 St. Clair Ave., Cleveland 17, Ohio



CLEVELAND

New PUBLICATIONS From MANUFACTURERS

The catalogs and bulletins reviewed below will keep you posted on latest developments in construction equipment and materials available for your use.

CEMENT CHARACTERISTICS—

Atlas mortar cement is discussed in a 24-p booklet published recently. There are sections on recommended practice covering materials, proportioning, mixing and laying, in addition to a number of handy reference tables. — **Universal Atlas Cement Co., 100 Park Ave., New York 17, N.Y.**

TORQUE COMBINATIONS—

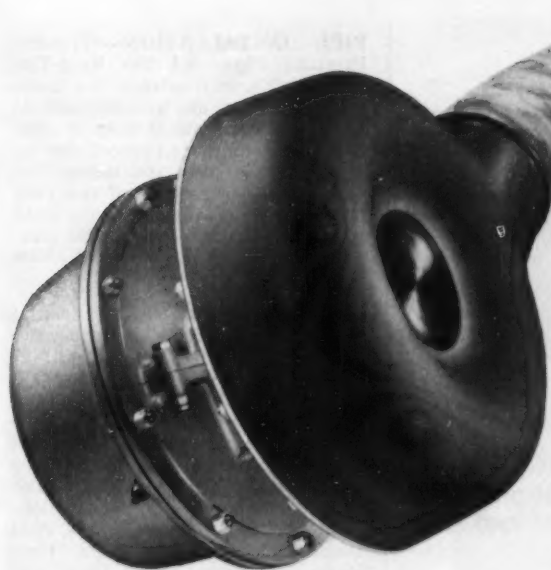
Torque converter combinations and their adaptability to heavy equipment are discussed in a 4-p illustrated brochure which should interest equipment manufacturers. The booklet discusses the application of disconnect clutches, forward and reverse drive systems, speed reducers and power take-offs when combined with Borg-Warner converters. — **Long Manufacturing Div. of Borg-Warner Corp., 12501 Dequindre St., Detroit, Mich.**

MASONRY BLADES—

A 4-p bulletin, illustrated in color, describes the Niagara line of masonry blades. Information included in the publication covers blade types and sizes, applications, a comparative grade chart, a description of the blade identification system and ordering information. — **The Carborundum Co., Niagara Falls, N.Y.**

LUBE SHEETS—

A simplified lubrication plan depends on only four basic lubricants to service almost every kind of construction equipment. The plan is designed to be used on large projects where, because of the variety of equipment involved, it would be impractical to follow all manufacturers' specified recommendations. The Pure Oil Co. is making available individual lubrication guide sheets covering 108 brands of equipment. These sheets list parts to be lubricated, recommended interval between servicing, and the product and grade to be used. The four basic lubricants are Purel heavy-duty motor oil, Purelube multi-purpose gear lubricant, Purelube MS grease, and Poco compounds for lubricating open gears, racks and wire ropes. According to Pure engineers, these four will handle practically all equipment servicing. Also available are general service suggestions, and recommended handling practices for lubricants used in the field. Specify type and brand of equipment when asking for lube sheets. — **Pure Oil Co., Box CS1, 35 E. Wacker Drive, Chicago, Ill.**



MORE DRIVE

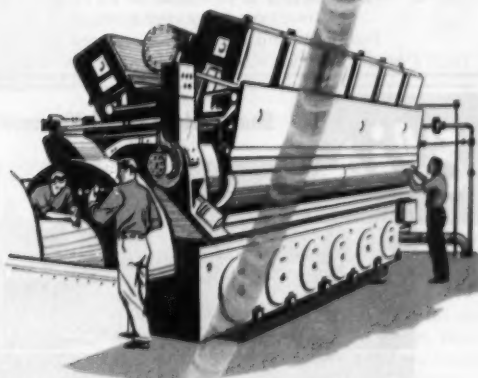
for your diesel!

Here is how the application of AiResearch Turbochargers can affect the performance of your mobile or stationary diesel equipment:

- ★ Adds more power in relation to size and weight than any other units in this field.
- ★ Decreases fuel consumption. Besides decreasing costs, this factor greatly increases the non-refueling range for mobile equipment.
- ★ Provides power as needed by responding rapidly to acceleration requirements. This factor greatly decreases smoking.
- ★ Maintains sea-level power under all altitude conditions.
- ★ Greatly reduces the noise level of your equipment while eliminating power-wasting mufflers.

AiResearch is the largest producer of small turbomachinery in the United States. Twenty-five million hours of experience in deriving exceptional power from small units is the background for the development of the AiResearch Turbocharger. This power package was recently applied to Caterpillar diesel machinery with startlingly effective results.

Your inquiries are invited.



THE GARRETT CORPORATION



AiResearch Industrial Division

9225 Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND RELATED MACHINERY

THE LITTLE MONSTER[®]

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COMPLETE
ASPHALT
MIXING
PLANT
ON WHEELS



IT'S RUGGED, COMPACT, AND DESIGNED FOR
SUBSTANTIAL DAILY PRODUCTION AND EASY
MAINTENANCE.

HERE'S an outstanding portable asphalt plant that can prove a real money-maker for many of your asphalt mixing jobs. It's a complete plant consisting of dual hot elevator, 2-compartment feed bunker designed for front end loader, rotary dryer, cyclone and exhauster, weigh-box mixer, and skip hoist discharge to hauling trucks. It is rated at 30 tons per hour on a one-minute mixing cycle, but has produced in excess of 40 tons per hour. Get complete details on this outstanding portable plant from your MADSEN Distributor... ask for Bulletin LM-1.



MADSEN WORKS

CONSTRUCTION EQUIPMENT DIVISION
Baldwin-Lima-Hamilton Corporation

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Construction Equipment Division

Elis

Shores Help Build Mammoth Chicago Parking Garage



Inset: Huge underground job in Chicago creates needed parking space. Photo: Elis Products and Methods work with all types of concrete forming work.

One of the largest shoring jobs in North America, within recent years, was the cavernous sub-surface parking garage built beneath Michigan Avenue and Grant Park in Chicago. Whether the suspended reinforced concrete floor forming is on a small or large scale, Elis Methods consistently prove to be safe, fast, highly adaptable, and economical for the contractor. Write for information concerning your next job, giving full specifications.

MFD. BY ELIS EQUIPMENT CO., INC., 211 N. W. 4th ST., OKLAHOMA CITY, OKLA.

PIPE INSTALLATION—"Transite Pressure Pipe and the Ring-Tite Coupling" is an illustrated 8-p booklet describing an asbestos-cement pipe for water systems. Step by step, it gives recommended procedures for installing the pipe and assembling the coupling, consisting of two rubber sealing rings that are compressed and locked in grooves on the pipe. —Johns-Manville, 22 E. 40th St., New York 16, N.Y.

CAT LITERATURE—An 8-p booklet called "Friction Facts" describes the testing procedures the Caterpillar Tractor Co. goes through to obtain materials used for clutch facing and brake linings. Other Caterpillar literature recently published includes a booklet describing final drive seals, and "Filter Research, How and Why . . ." describing the development of Caterpillar oil filters. Also available is a booklet called "How to Be Sure About Track Parts," an 8-p discussion of the research and testing behind Caterpillar tracks. —Caterpillar Tractor Co., Peoria, Ill.

HOPPER SCALES—A 4-p folder describes various types of suspension hopper scales that are widely used for batching sand, water, and cement in the production of concrete. The scales, with capacities of from 500 to 100,000 lb, will fit any size or shape hopper. They are of all-steel construction, with steel pivots and bearings, and can be equipped with dial indicators or with weigh beams. —Webb Corp., Webb City, Mo.

MAINTENANCE—Service tools and sets for Oliver tractors are discussed in a new 4-p bulletin which features detailed on-the-job photographs of an extensive cross-section of the mechanical and hydraulic service applications possible with OTC tools and equipment. —Owatonna Tool Co. 380 N. Cedar St., Owatonna, Minn.

ROAD BUILDING—A newcomer to the road building equipment industry, General Road Machines, Inc., Niles, Ohio, has available a folio describing their line. Included is a 20-p folder on their compacting screed finisher, literature on their sub-grader, curb and gutter forms, and a 4-p description of their other products. —General Road Machines, Inc., North Main St., Niles, Ohio.

RUBARITE—An illustrated brochure discusses Rubarite, a new rubberized material for use in asphalt and tar. Rubarite is made from a combination of unvulcanized synthetic rubber latex and minute particles of barytes, a chemically inert mineral. The three types now being produced are a paving grade for bituminous concrete, a mixing grade for rubberizing asphalt prior to use, and a grade used for rubberizing tar for jet-resistant airfield surfaces. —Rubarite, Inc., 141 W. Jackson Blvd., Chicago 4, Ill.



\$750 SAVED IN ONE SEASON using Torque converter on power shovel

A prominent contractor recently reported that he saved \$750 in one season using a Twin Disc Three-Stage Torque Converter on one of his power shovels.

This total was comprised of savings on three different phases of the shovel's application. (1) Cable—on two shovels with direct drive, cables were replaced *seven times* on one and *eight times* on the other. With torque converter drive, however, the cable was replaced *only three times*. Resultant saving: \$350. (2) Maintenance

costs—a saving of 12½ cents per hour, or a season total of \$250 on the shovel with the Twin Disc Converter. (3) Fuel consumption—the torque converter unit used ½ gallon less fuel per hour, saving \$140 in the 2,000 hour season.

You can realize a *similar* saving from your power shovels. Specify Twin Disc Torque Converters for your new units or *install* them in your existing equipment. For full details see your equipment or engine distributor. Write for bulletin 135-D.

All facts in the above story are contained in an actual case history. We have not identified the operation because publishing the owner's name would reveal confidential information.

Here are five money saving advantages that torque converter drive provides your particular power shovel application.

CABLE PULL—Torque converter automatically adjusts for wide variations in dipper loading, substituting greater digging effort for speed when required.

ENGINE OUTPUT HORSEPOWER—Torque converter allows engine to produce near maximum hp when load requires it. High engine power always available for hoisting and crowding.

ENGINE SPEED—Torque converter provides high engine speed throughout its working range, and higher hp output is available for heavy digging and hoisting loads. Converter equipped engine can't lug. Heavy overloads will not kill the engine.

LOWER MAINTENANCE COST—Torque converter reduces peak loads throughout shovel drive train. Cushioning shocks increases wear life for most parts subject to fatigue failure.

LONGER CABLE LIFE—In proved installations, even frayed cables with short life expectancy have been known to last a year or more where a torque converter has provided smooth, sustained output power.



TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

BRANCHES OR SALES ENGINEERING OFFICES: CLEVELAND • DALLAS • DETROIT • LOS ANGELES • NEWARK • NEW ORLEANS • TULSA

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Cuts and Snags



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FIRESTONE Nylon Off-The-Highway Truck Tires are built to deliver more hours of service on the toughest rock work, earth moving or strip mining job.

The Firestone Safety-Tensioned Gum-Dipped* nylon cord body with four extra tread plies absorbs toughest impact shocks. It gives the greatest protection against flex breaks, heat failures and damage due to cuts and snags.

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Let your Firestone Dealer or Store show you how Firestone Nylon Tires can cut your tire costs.



A TIRE FOR EVERY ROAD, LOAD AND CONDITION OF SERVICE

GROUND GRIP

• ROCK GRIP

• TRACTION ROCK

• ALL NON-SKID

• ALL TRACTION

• RIB EXCAVATOR

When you buy new equipment or replacement tires, specify FIRESTONE

Enjoy the Voice of Firestone on radio or television every Monday evening over ABC

Copyright 1955, The Firestone Tire & Rubber Co.

TANDEM ROLLERS—A new 16-p bulletin (HWT-501) on its tandem roller line features color photos of Huber-Warco units in action and describes in detail the company's 5-8, 8-10, 8-12 and 10-14 ton models. With cross-sections, diagrams and photos, the bulletin points out features of the frame, gear train, guide-roll assembly, fluid coupling, clutches, dual controls, accessibility for servicing, ventilation, two independent braking systems, and close curb clearance.—Huber-Warco Co., Marion, Ohio.

PALLETIZING — A single-sheet service bulletin called "The Palletizing of Bulk Materials," illustrates typical palletizing of Hydreon refractory castables, Franco and Super Franco plastic firebrick and Franset, France and Francite mortars. The chart breaks down the number of packaged units which can be conveniently palletized on various size carriers.—J. H. France Refractories Co., Dept AD, Snow Shoe, Pa.

TUNNEL LINER PLATES — "Tunnels do it Better" is the title of a new publication which describes speed of installation with Armco liner plates. Features are low cost, use of simple tools, strength of plates and varied applications. Useful data including detailed drawings and physical properties. — Armco Drainage & Metal Products, Inc., Middletown, Ohio.

PLASTIC TARPAULINS—A new electrically-welded nylon and vinyl plastic covering, designed to be used like canvas, has been marketed by the manufacturers of Herculite tarpaulins. According to the manufacturers, the plastic covering will last longer than canvas; will not rot, mildew, fade, shrink or stretch; weighs less than canvas; is completely waterproof and is resistant to abrasion. It is manufactured in units of 100 ft wide by unlimited lengths.—Fellowcraft Engineering, Inc., 270 Jelliff Ave., Newark 8, N. J.

3-YD SHOVEL—A 16-p bulletin describes the 71-B, Bucyrus-Erie's 3-yd shovel. The illustrated bulletin discusses the machine's features and offers a listing of general specifications. It describes dragline, clam-shell or lifting applications and generally discusses basic engineering features and field-proved test data on the 71-B.—Bucyrus-Erie Co., South Milwaukee, Wis.

HD-16, TS-360—Engineering, design and mechanical features of the HD-16 crawler tractor are described in a new two-color brochure. A similar brochure describes the new TS-360 motor scraper. Photographs and specifications are included in both brochures. — Allis-Chalmers Manufacturing Co., Tractor Group, Construction Machinery Div., Milwaukee, Wis.

The THORO System of Masonry Protection

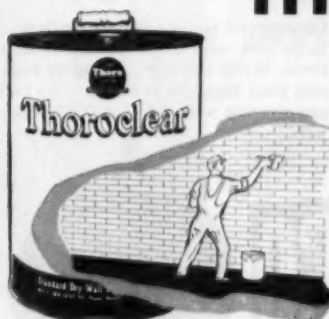
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Ask your dealer about this powerful silicone water repellent developed by years of research by General Electric Company and now produced by us for your protection. Ask for Circulars No. 30 and 31.

No change in color or texture of brick, limestone, sandstone, tile or stucco surfaces. Applied by brush or spray.

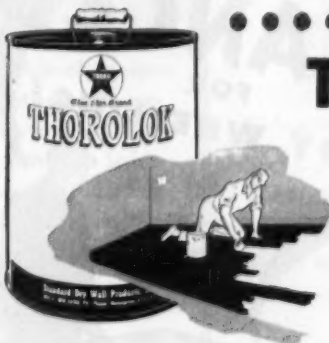
Keep water out of your masonry walls and protect interior plaster, paints and expensive furnishings.



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Repair those broken sills, steps, concrete floors, chimneys and other defective masonry! Ask for circular No. 20.



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for all types of
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STANDARD DRY WALL PRODUCTS, INC.
NEW EAGLE, PENNSYLVANIA



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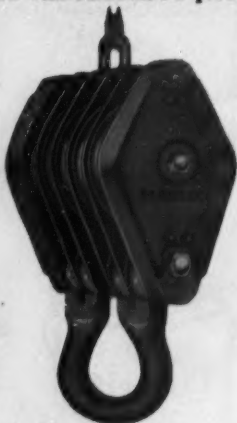
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Heavy construction calls for heavy-duty blocks and MADESCO blocks combine the performance features developed through 30 years of specialized engineering for the construction field. Heavy steel shells and fittings, heavy iron or steel graphite-bronze, self lubricating

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A Subsidiary of Nazareth Cement Company

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You'll find it so easy to wheel heavy loads in Sterling Barrows. Only a minimum of effort is required. Sterling's perfectly balanced construction permits 80% of the load to be carried on the wheel . . . only 20% by the operator. This increases efficiency . . . allows more loads to be hauled each day . . . reduces hauling costs.

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Model CSW with
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Carnaghi digs into lubrication problem...comes up with answer



Ray J. Carnaghi (right) discusses lubrication of equipment with Frank Wolan, Standard Oil automotive engineer. Frank has been serving customers for Standard Oil since completing the Standard Automotive Sales Engineering School. He got his engineering training at Michigan State College. Customers have found Frank's experience and training pay off for them.



STANOLUBE HD-M MOTOR OIL

Like every outfit in the business of moving earth, Joseph P. Carnaghi & Sons, Detroit, know what it means to keep equipment on the move. There is no place on the schedule for stuck rings, bearing failures, fouled plugs. Down time due to lubrication failure is something Carnaghi learned how to eliminate 20 years ago. It was then that this contractor began using Standard Oil products.

Now STANOLUBE HD-M Motor Oil is used in Carnaghi trucks, cranes, shovels and dozers. Earth haulers that go away heavy and come back light, give oil a full challenge to deliver trouble-free operation. Wet, dry, heat, cold, and grit are the order of business for dozers, shovels, and cranes. They give motor oil tough, rugged jobs to do.

STANOLUBE HD-M stands up to the jobs Carnaghi gives it with a wide margin to spare. It is designed to do just that. Carnaghi equipment maintenance men have found this out from inspection of equipment at overhaul time. Their skilled maintenance, teamed with STANOLUBE HD-M, result in:

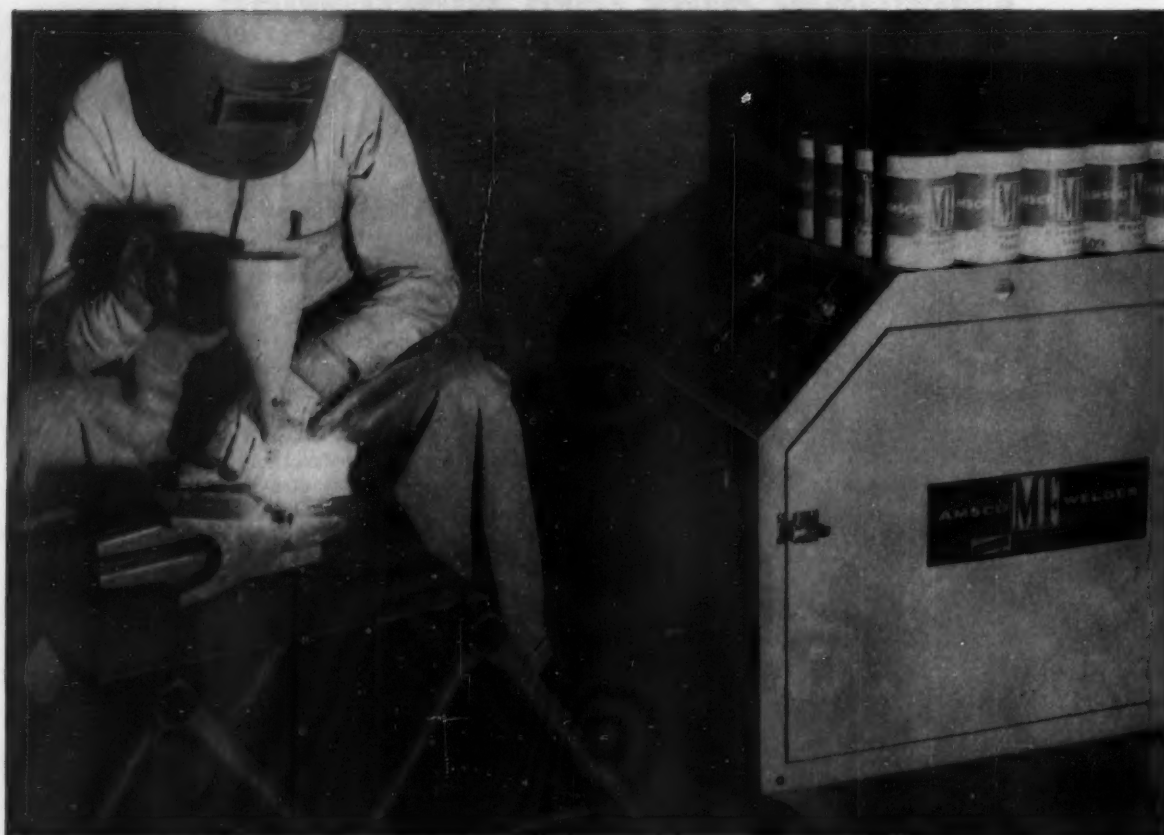
1. Pistons free of varnish
2. Less cylinder and ring wear in high temperature service
3. Valve stem deposits and valve burning virtually eliminated.
4. Engines unaffected by unstable fuels
5. Less spark plug fouling
6. In low temperature service, less sludge

This sound like the kind of operation you would like for your equipment? A Standard Oil automotive engineer will be happy to tell you how, with STANOLUBE HD-M, you can get it. In the midwest, a call to your nearby Standard Oil office will bring prompt response. Or contact Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.



STANDARD OIL COMPANY (Indiana)

Contractor Joseph P. Carnaghi & Sons dig foundation for new building. STANOLUBE HD-M Motor Oil is used in all Carnaghi equipment.



Welder is shown welding a "wear-sharp" repointer to the shank of a dipper tooth using the Amsco MF and flux.

HARDFACE WITH THE AMSCO® MF

for manual flexibility . . . plus machine speed and accuracy

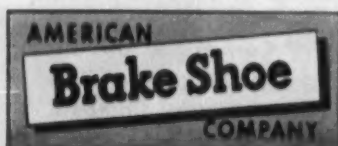
The Amsco MF combines the visibility and craftsmanship of hand welding with the automatic advantages of machine work. Speed of hardfacing increases because the Amsco MF uses small-diameter electrode and high-current densities which allow the operator to maintain a high deposit rate. The electrode feed is continuous—and automatically regulated—to maintain a constant arc. Thus, the machine automatically *compensates* for operator movement or an irregular welding surface.

Cost of deposited metal is less! The Amsco MF uses coiled, bare mild steel electrode. It feeds through the flux hopper (the cone).

There it is magnetically coated with your choice of manganese steel build-up or hardfacing alloy which is carried in the flux. You coat your electrode as you weld at considerable savings in deposit cost.

The machine is portable. It plugs into any standard welding unit, and requires no special setup. See a demonstration of the Amsco MF's speed, quality of weld and uniform deposit. Try it yourself and discover how easy it is to operate. Your Amsco Distributor is ready to show it to you now. Welding products are distributed in Canada by Canadian Liquid Air Co., Ltd.

make your Amsco Distributor HARDFACING HEADQUARTERS



AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Ill.

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SIGHT LEVELS INSTANTLY!
STRATEX SURVEYING
Hand Level
\$12
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STRATEX INSTRUMENT CO., INC.
3150 SUNSET BLVD., LOS ANGELES 46, CALIF.



Malsbary Model 250 cleaned this D4 in less than 60 minutes. Note compact, hard-hitting stream and absence of work-hiding steam.

Here's Quick, Easy Way to get Rid of Grease, Tar, Caked Dirt

20% Greater Pressure and Volume of
New Malsbary 250 Enables You to Clean
Twice as Fast as Steam Vapor Cleaners

Tough equipment cleaning jobs require lots of hot solution and real impact. There's plenty of both in the new Malsbary 250 HPC (high pressure combination) cleaner. Top pressure has been boosted 20% to 300 p.s.i., volume upped to 360 g.p.h. This pressure delivers cold water, hot solution (steam), or hot rinse with an explosive impact that blasts away stubborn asphalt or caked mud and grease other cleaners can't touch. In addition, you get wet steam and hot water for such jobs as cleaning and degassing tanks, thawing, or concrete mixing in zero weather.

Two-way Pay-off

The Malsbary 250 does any cleaning job twice as fast as a steam vapor cleaner; and does most jobs 4 to 10 times faster. Cleaning a D8, for example, takes 1½ to 2 hours with the

Model 250 compared with 8 hours for steam vapor cleaner. You save 6 hours labor, and gain 6 hours of tractor working time. Where you're operating or renting equipment fleets savings in equipment downtime alone on just a few cleaning jobs often more than repay the cost of a Model 250.

Why settle for a half-way cleaner when a Malsbary 250 can cut your cleaning costs in half? For proof, ask your Malsbary dealer to demonstrate on your job now... or write us today for the 8-page catalog describing the new, improved Model 250.



Room C, 845 92nd Ave., Oakland 3, Calif.

For extra heavy service



066 RED END



Similar to X-46 without brass extension and extra heavy sections. 4, 5, 6 & 8 ft. lengths.

066D ENGINEERS



Marked feet, 10ths and 100ths feet one side, feet, inches, 16ths other side.

LUFKIN

X-46 RED END EXTENSION WOOD RULE

Hundreds of thousands of craftsmen the world over prefer the Lufkin X-46 because:

- IT'S EXTRA DURABLE. Has select, straight-grained hard maple sections 50% thicker than standard. Brass strike plates prevent wear.
- IT STAYS ACCURATE. Rust-proof triple-locking joints don't loosen.
- IT STAYS EASY TO READ. Bold markings are embedded right into the wood and protected by a hard plastic finish.

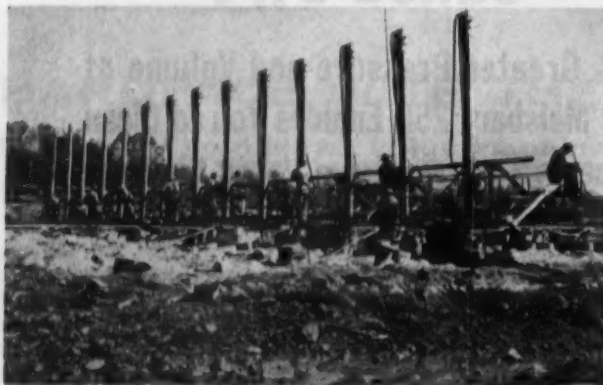
Solid brass extension with black filled figures makes inside measurements easy. 6 foot lengths. Also available with "flat" markings or Folding End Hook.

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THE LUFKIN RULE CO., Saginaw, Michigan

388



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terrain problem

Faced with blasting an 8,000 foot tailrace out of a river bottom, consisting of a maze of boulders and mud holes, the Central Engineering & Contracting Corp., Durham, N.C., tied 14 drills together, mounted them on rails, used 2 1/2" Rok-Bits® and kept the job ahead of schedule, their profits secure. 1,300,000 cubic yards of rock were removed after drilling 24 ft. holes, with 6 ft. steel changes. For job details and reasons why Rok-Bits were used above all other makes—phone, or write, nearest Brunner & Lay plant.

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fight tuberculosis



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Loading large trucks at this huge open pit operation at the rate of approximately 2800 tons per 8 hour shift is moving tonnage at a very low cost.

This tonnage will be increased in the next week or ten days to approximately 4000 tons per 8 hour shift as the operators become

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The trend to smaller, highly mobile, less expensive excavators is understandable. Tough, heavy-duty units like the Eimco 105 will actually out produce the larger, cumbersome, slow moving predecessors and the cost of these smaller units is only a fraction of the cost of larger boom type equip-

ment with the same or even greater bucket capacity.

If you are interested in production-and-costs, the following suggestions will be interesting to you:

1. Investigate the Eimco 105 and get a list of users who are working in conditions similar to your own.
2. Check the Eimco 105 against any other equipment doing a similar job and ask users their opinions.
3. Check with other manufacturers who offer equipment for the same work and see how the prices compare.

Eimco will be glad to have one of their engineers answer questions you may have about the Eimco Tractor.



THE EIMCO CORPORATION

Salt Lake City, Utah—U.S.A.

Export Offices: Eimco Bldg., 52 South St., New York City

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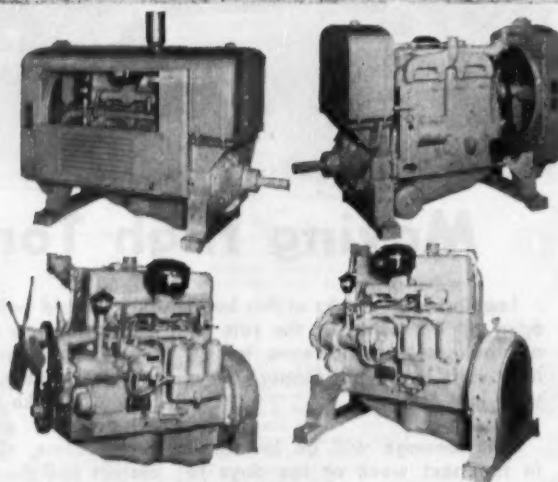
For these reasons MM units are ready to go when equipped with specified operating accessories. You eliminate major auxiliary unit purchases to adapt engine characteristics to meet momentary high load demands. Further long run benefits are low fuel consumption and low maintenance that total up to low cost production.

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Standard equipment includes vacuum crankcase ventilation, thermostat controlled bypass cooling, packaged water pump, built in variable speed governors, enclosed gear driven oil pump, and oversize full-flow oil filters (shunt-type filters are provided exclusive on MM Thermo-Clad units).

Send details on your application for examples of MM built-to-order packages for original or replacement needs. Engineering service available for pumps, hoists, crushers, generators, shovels, ditchers, cranes, compressors, feed mills, saw mills, planing mills and similar installations. When you want dependable performance year after year from your engine, you want an MM Industrial Power Unit.

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Write for Bulletin No. 507 for the complete story.



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Methods Memo . . .

PICKING SEVEN WONDERS of engineering and construction in the U.S., where such wonders abound, is a task for a Solomon. Probably a lot of construction men won't agree fully with the list of seven wonders selected by a special committee of the American Society of Civil Engineers. There may be—and almost certainly are—other projects that are just as significant as the seven chosen. But we think the American builder can be content to stand on the record of skill and enterprise built into these seven wonders:

- **Chicago Sewage Disposal System.** It involved reversal of the flow of the Chicago River and construction of the world's largest treatment works.

- **Colorado River Aqueduct.** It crosses 250 mi of desert and mountains and is part canal, part tunnel, and part siphon.

- **Empire State Building.** The tallest building man has constructed.

- **Grand Coulee Dam and Columbia River Basin Project.** This is a giant irrigation project that includes the world's largest hydroelectric power plant.

- **Hoover Dam.** It is the world's highest dam.

- **Panama Canal.** ASCE called it "greatest of geographical surgical operations."

- **San Francisco-Oakland Bay Bridge.** Its construction involved the most spectacular foundation job of modern times with huge caissons sunk to a depth of 242 ft.

LONGEST CANTILEVER SPAN river crossing in the U.S. will be erected by Bethlehem Steel Co. The Mississippi River Bridge Authority of Louisiana has awarded Bethlehem a \$12.3 million contract for the superstructure of the Greater New Orleans Bridge over the Mississippi.

Bridge will connect two sections of the city. Dravo Corp. of Pittsburgh is building the four main piers under a \$6.7 million contract. Bids have not yet been called for the approaches.

Longest cantilever span over any body of water in the world is the 1,800-ft bridge over the St. Lawrence River at Quebec, Canada. Second longest is the 1,700-ft Firth of Forth railway bridge in Scotland. The Mississippi River bridge will rank third with a main channel span of 1,575 ft. Two anchor spans will make the bridge 3,019 ft long abutment to abutment.

Bethlehem expects to start construc-



TO KEEP IT WONDERFUL, construction men are hard at work alongside the Panama Canal, chosen one of the seven wonders of engineering and construction in the U. S. The Panama Canal Co., Army Engineers, and Tecan Corp. of Dallas, Tex., have one of the most challenging excavation jobs since construction of the canal itself. They are working on Contractors Hill, a block of fractured and jointed rock that threatens to crack wide open and slide into the canal. They must excavate about 4,500,000 tons of rock from the face of the hill without increasing the danger of a major rock slide or interfering with the passage of ships through the canal, 330 ft below. Slides have closed the canal seven times since it was completed.

tion next summer. It has 820 calendar days to fabricate and erect 16,200 tons of steel and install 900 tons of eyebars, 1,400 tons of grid flooring, 30 tons of aluminum grating, 6,000 lin ft of hand-rail, 820 cu yd of concrete, the deck drainage system, and all water and aerial navigation lights and other electrical work. Modjeski and Masters, Harrisburg, Pa., are engineers and designers of the bridge.

SOME HIGHWAY MEN chopped up a section of a 20-yr old road in South Carolina for souvenirs last month. We got a piece of the road in the mail. It looks like sandstone, but actually it's part of the first engineered soil-cement pavement in the U.S. We use our part of the 1½-mi section of State Route 41 near Johnsonville, S.C., as a paper-weight.

The souvenir hunters who attended the 20th anniversary of the laying of this pavement included C. R. McMillan, chief highway commissioner, and S. N. Pearman, chief engineer of South Carolina, B. P. McWhorter and K. F. Shippey of the Bureau of Public Roads, and Donald Kennedy, president of the Portland Cement Association.

CONSTRUCTION got under way this month on a king-size project that has been a conversation piece for years. It's the widening of Chicago's Calumet-Sag channel which connects the St. Lawrence-Great Lakes waterway with the

Illinois-Mississippi River waterway system. The entire project will cost an estimated \$188 million.

Groundbreaking took place Nov. 2. Mary Construction Co. of Cape Girardeau, Mo., began work under a \$1.8-million contract on the first phase of widening the 16-mi channel from 60 to 225 ft. The last Congress made possible the construction start by voting a \$4 million appropriation.

Later work, in addition to widening of the channel, will include replacement of railroad and highway bridges and construction of a lock at the Calumet River. The project, when completed, will increase the capacity of the waterway from its present 3,500,000 tons of cargo a year to 8,000,000 tons. If Congress continues to make available funds for the project, construction will be completed in 6 yr.

TO PREVENT SKIDDING the New Jersey Highway Department is placing a "coarse sandpaper finish" on the roadway of heavily traveled Pulaski Skyway between Newark and Jersey City. The new surface consists of successive layers of hot tar, ¾-in. stone chips, hot tar again, and finally a light topping of grits. A heavy steel center barrier to separate traffic in opposite directions also is being erected. An average of 60,000 vehicles use the Skyway every day. Last year there were 430 accidents on the road. Five persons were killed and 276 injured.

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concreting
conditions
here...**

Underground powerhouse of Hydro-Quebec's Bersimis-Lac Causse project, some 450 miles northeast of Montreal, where 1,200,000 horsepower of electricity will be generated. Concrete produced with Pozzolith at central batching plant by Dufresne Engineering, Ltd.

engineers of Bersimis Power Project employ **POZZOLITH** for vital three-way control

In the production of 400,000 cubic yards of concrete for the 31-foot, 8-mile-long tunnel lining, powerhouse, and tailrace of the giant Bersimis power project, engineers faced the following concreting difficulties:

- Sand obtained at jobsite accidentally entrained air in the amount of 8-10%. Complete air detrainment was necessary and Pozzolith was used to entrain the proper amount of air.
- Initial retardation was desired to facilitate handling the concrete over long hauls in 8-yard dump trucks, then into pneumatic placers and pumped concrete machines.
- Once deposited against cold rock inside the tunnels — air temperature 50° — they wanted rapid gain in strength to permit early stripping and re-use of forms. (Actually forms were stripped 11 hours after concrete placing).

Engineers employed Pozzolith to most economically meet these conditions and in addition produce concrete with minimum shrinkage, necessary for tunnel work.

This was another project where Pozzolith provided three important controls: Minimum unit water content consistent with proper placement, control of air content and control of rate of hardening.

Ask us to demonstrate the many advantages of Pozzolith for control of concrete quality on your projects.

Tunnel almost 8 miles long driven through granite. Upper View—tunnel form in place; Lower View—manifold showing penstock No. 6, 7, 8.

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Why Isbell uses TIMKEN® carbide insert bits in drilling Jasper and Dolomitic limestone

**CARBIDE INSERT?
or
MULTI-USE?**

LOCATION: Van Stone Mine,
Northport, Washington.

OPERATING CONDITIONS:
Drilling in Jasper and Dolo-
mitic limestone.

IN drilling operations at the Van Stone Mine, Northport, Washington, Isbell Construction Company found it more effective to use Timken® carbide insert bits to drill hard Jasper and Dolomitic limestone.

In such extremely hard, abrasive ground, where a steel bit will not drill out a full increment of drill steel, Timken carbide insert bits speed the operation. Because of their large cross-section of carbide, they allow the most reconditionings per bit, and maintain their original gauge longer. They're most economical for constant-gauge holes, small-diameter holes, and extremely deep holes.

But Timken carbide insert bits may not be the best solution to *all* your drilling problems.

In ordinary ground, for instance, Timken multi-use bits are most economical. With correct and controlled reconditioning, they give the lowest cost per foot of hole when full increments of steel can be drilled.

Both types of Timken rock bits are made from Timken fine alloy steel, made in electric furnaces. No other rock bit manufacturer takes the extra quality control step of making his own steel.

Many different Timken carbide insert and multi-use bits are interchangeable in the same thread series, so drillers can change bit types quickly and easily as the ground changes—right on the job. And, because of the special shoulder union developed by the Timken Company, the threads on both multi-use and carbide insert bits are protected against damage due to drilling impact.

Our rock bit engineering specialists can help you select the right bit for your particular needs. They possess more than twenty years of on-the-job drilling experience. Take advantage of this extra service. Call or write the Timken Rock Bit Engineering Service, The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

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